

Aayushi International Interdisciplinary Research Journal (AIIRJ)

Peer Reviewed and Indexed Journal

ISSN 2349-638X

SJIF Impact Factor 8.379

Website: www.aiirjournal.com

Theme of Special Issue

‘Exploring Pillars for Viksit Bharat-2047’

(Special Issue No. 159)

Editors-in-Chief

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Aayushi International Interdisciplinary Research Journal

ISSN 2349-638x

Special Issue No.159

Feb.2026

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From the Principal's Desk



It gives me an immense pleasure and pride to publish the proceedings of the National Conference on ***“Exploring Pillars for Viksit Bharat 2047.”*** This conference has provided a valuable academic platform for academicians, researchers, and information professionals to deliberate on the changing role of different contributors to the development of the nation and achievement of the objectives.

The National Conference on “Exploring Pillars for Viksit Bharat- 2047” is a visionary platform aimed at fostering dialogue, innovation, and collaboration to realize the goal of a Developed India by 2047. The conference brought together policymakers, academicians, industry leaders, entrepreneurs, students, and civil society to deliberate on transformative strategies for inclusive, sustainable, and technology-driven national growth.

This national conference successfully addressed contemporary issues, recent trends, and challenges and role of various sectors in achieving objectives of Viksit Bharat. Through keynote addresses, panel discussions, paper presentations, and interactive sessions, the conference paved way to generate actionable insights and policy-oriented recommendations for nation-building. Let this conference serve as a catalyst for ideas that empower our citizens, strengthen our institutions, and contribute to building a prosperous and self-reliant India.

I extend my sincere appreciation to the Editor, Miss Dipali Chavan for her dedicated efforts in bringing out this conference issue. I also congratulate the organizing committee, reviewers, authors, and all contributors for their academic involvement and commitment towards the success of this conference.

I am confident that this publication will serve as a valuable reference source for researchers, students, and professionals in the field of Commerce and Management and Social Sciences. I wish the journal every success and hope it will inspire further research and innovation in the field and Vision of Viksit Bharat-2047.

Dr. Gurunath Fagare
Principal

Kisan Veer Mahavidyalaya, Wai

From the Editorial Desk



We are pleased to present this special issue of the journal dedicated to the National Conference on “*Exploring Pillars for Viksit Bharat 2047*”, organized by the Department of Commerce and Management, BCA, and Psychology, History, Political Sciences, Economics in association with IQAC. This issue provides a platform for academicians, researchers and information professionals to share their research findings, experiences and innovative practices related to the application for “*Exploring Pillars for Viksit Bharat 2047*”.

This enthusiastic participation of academicians, researchers, and scholars across the nation reflects the collective intellectual commitment towards contributing to the vision of Viksit Bharat 2047 — a developed, self-reliant, and globally competitive India. The research papers submitted cover diverse dimensions such as economic growth, sustainable development, digital transformation, governance, reforms, social empowerment, innovations, and entrepreneurship. Each contribution adds meaningful insight into the structural and strategic pillars required to achieve the national vision of Vikasit Bharat

As Chief Editor, I sincerely appreciate the dedication of all authors, reviewers, members of the organizing committee, and IQAC for maintaining academic rigor and quality throughout the review and publication process. The success of this conference is a testament to our institution’s commitment to fostering research culture, interdisciplinary dialogue and academic excellence.

I sincerely appreciate the valuable contributions made by the authors, whose scholarly papers have enriched the knowledge and added literature through this journal issue. I am also grateful to the reviewers and editorial board members for their critical evaluation and constructive suggestions, which helped maintain the academic quality of the publication. Special thanks are due to the organizing committee and all contributors who worked tirelessly for the successful completion of this conference journal.

My personal gratitude goes to the eminent personality Hon’ble Dr. Deepak Karanjikar, Advisor, Viksit Maharashtra, Government of Maharashtra who had accepted our invitation as Chief Guest of Inaugural Function and Keynote Speaker, shared his views and ideas. Dr. Parashram Patil , Advisor, Viksit Maharashtra, Government of Maharashtra had accepted our invitation as Resource Person and Dr. Major Ashok Giri, Principal A.S.S.M, Medha for sharing their valuable views in Valedictory function.

We owe our sincere thanks to Hon’ble Shri. Madandada Bhosale, President, Janata Shikshan Sanstha, Wai who is the constant source of inspiration and driving force behind the execution of innovative ideas. We are thankful to secretary Hon’ble Dr. Jayawant Chaudhari for his kind support in the venture. I express my gratitude to Hon’ble. Principal Dr. Gurunath Fagare for his constant support. The organizing committee member also contributed a lot for the success of the Conference. The said conference would not have been successful without cooperation and support of the faculty, library staff and administrative staff. I thank all of them for their kind support and cooperation.

I am confident that this issue will serve as a useful source of knowledge and inspiration for professionals, researchers and students. I hope it will encourage further research and innovation, contributing to the continuous development of Viksit Bharat in digital era.

Executive Editor

Miss. Dipali Chavan

Assistant Professor, Department of Commerce and Management
Kisan Veer Mahavidyalaya, Wai

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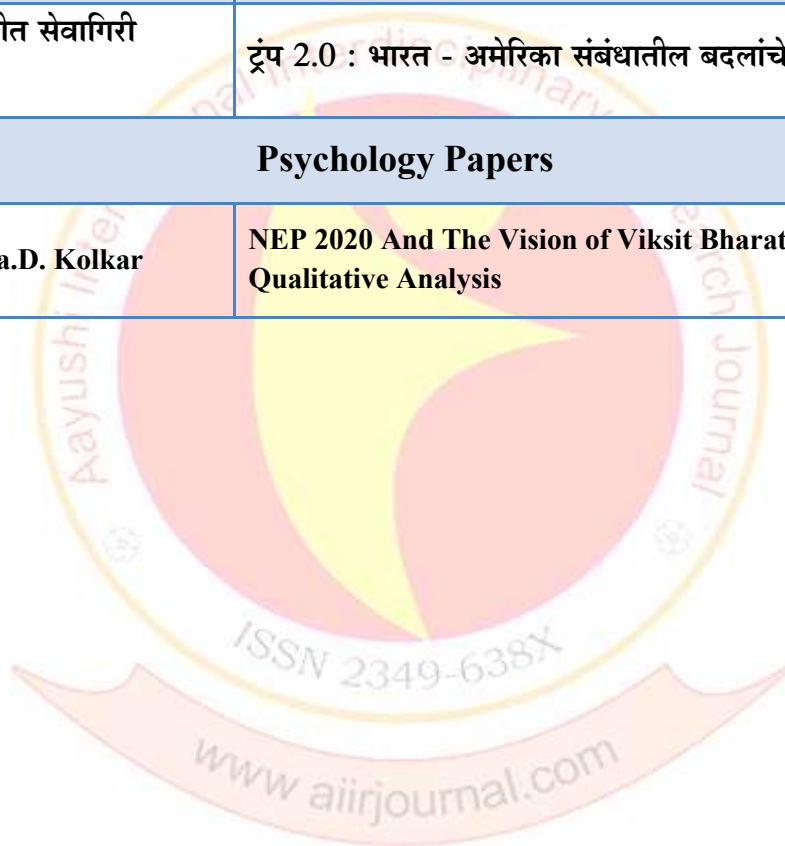
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A Study on Work Life Balance And Employee Performance in Manufacturing Sector in Satara

Mrs. Prachi Tushar Raut. (Research Scholar)

Dr. Sarang Shankar Bhola. (Ph.D. Guide)

Institute Name: KBPIMSR Satara.

Abstract:

Work-life balance in the manufacturing sector is often challenged by rigid, long-hour shifts and high physical demands, leading to potential burnout, reduced well-being, and high turnover. Effective solutions include implementing flexible scheduling, shift rotation, and supportive management to improve employee health, productivity, and retention. Work-life balance is the term used to describe practices in achieving a balance between the demands of employees family (life) and work lives. The demands and pressures of work make difficult to stretch time for balancing work-life activities. The main objective of this study is to examine the relationship between work-life balance (WLB) and employee performance. Using a survey questionnaire, this research was conducted with sample of 100 employees from manufacturing companies in Satara. Data was analyzed using descriptive and inferential statistics such as mean, frequency, percentage, coefficient correlation and Regression analysis. The result revealed that there is a positive relationship between work life balance and employee performance.

Keywords: Work-life balance, work environment, employee performance.

1.1 Introduction:

Research on work-life balance originated in studies of women who played multiple roles. Barnett and Baruch (1985) investigated the psychological distress associated with the balance between satisfactions and concerns arising from women's multiple roles as employees, wives, and mothers. They found that a positive quality of roles—more satisfactions than concerns—was associated with lower levels of workload, role conflict, and anxiety. Based on their research, Barnett and Baruch defined role balance as the difference between "satisfactions minus satisfactions," ranging from positive to negative values (Rantanen et al., 2011).

A healthy and ideal work-life balance promotes greater job satisfaction, improves employee performance, keeps them motivated, and reduces stress, thus lowering costs for the organization (Satpathy, Litt, et al., 2019). Work-life balance should not be interpreted as an equal division of time dedicated to professional and personal activities. A good work-life balance is based on fulfillment and enjoyment. A relevant definition of this balance could be daily satisfaction and pleasure in each of the four areas of life: work, family, friends, and personal development. This ideal balance varies from person to person over time, depending on age and career path; different factors influence each individual. (Sree, 2012).

Work Life Balance In Manufacturing Sector :

In the manufacturing industry, where the work process is rigorous and monotonous, constant efforts have been made to improve the quality of working life since the Industrial Revolution. In the 1930s and 1940s, trade unions promoted a radical transformation of working conditions and the work environment through collective bargaining. According to IBEF (2018), "India has become one of the most attractive destinations for investment in the manufacturing sector," thus providing employment opportunities for hundreds of thousands of people. However, jobs in this sector are often uncreative and unstimulating; they are simple and do not require great intellectual effort. This sector faces problems such as weak enforcement of rules and regulations and a lack of a strong organizational culture. These problems lead to employee dissatisfaction and affect their work-life balance (Satpathy, Patnaik et al., 2019). Work-life balance is a key factor in employee performance. Studies show that an ideal balance increases productivity, strengthens engagement, and reduces burnout. On the other hand, an inadequate work-life balance leads to significant

stress, absenteeism, and high staff turnover. Key practices such as flexible hours, remote work, and supportive management improve performance by aligning employee well-being with company success.

1.2 Research Problem:

Despite the growing importance of work-life balance, many employees struggle to maintain a sustainable balance between their work and personal lives. This imbalance leads to increased stress, decreased productivity, and higher staff turnover. This study examines the impact of work-life balance on employee performance and explores strategies for fostering a more balanced workplace culture.

1.3 Review Of Literature

Lingard and Francis (2005) found that the construction industry is characterized not only by a culture of long working hours but also by weekend work. In fact, many sectors, such as real estate, tourism, and hospitality, experience a similar situation. People working in these sectors may suffer from a work-life imbalance, as the time dedicated to one area reduces their available free time.

Middleton and Cukier (2006) also found in their study that the use of mobile communication technologies, such as cell phones and mobile email, can not only be dangerous, distracting, and antisocial but also blur the boundaries between work and personal life. This data indicates a trend toward working outside the traditional workplace, driven by the adoption of new information technologies.

According to V. Chandra (2012), her study aimed to compare Eastern and Western perspectives on work-life balance. Demographic changes and the creation of work environments that support family life contribute to this balance. A universal strategy may not be suitable for individual and organizational needs.

According to Omar Fayaz Khan and Asif Iqbal Fazili (2016), work-life balance is becoming increasingly important, particularly due to technological innovations that encourage employees to adopt a customer-centric approach. The introduction of the virtual office has blurred the lines between these two spheres. This benefits employees and improves organizational effectiveness by boosting productivity, organizational citizenship, and overall performance.

According to C. Karpagham and R. Magesh (2017), their study on work-life balance among employees in the organized manufacturing sector revealed that working hours were the primary impact factor.

According to Satpathy, Ipseeta et al. (2019), their study, based on a literature review and secondary data from selected articles, established a conceptual framework that explains the causes of work-life imbalance. This study examines the factors that influence this balance and the challenges faced by the manufacturing sector. It has been suggested that employers incorporate work-life balance programs into their policies, benefits, and services. Furthermore, the policies and strategies implemented should be designed to change employees' perceptions of their employer and encourage them to stay with the company longer.

According to Binaebi Gloria Bello et al. (2024), this article offers an in-depth analysis of the work-life balance concept and its impact on contemporary organizations, highlighting the role of human resources (HR) in promoting a harmonious balance between work and personal life. This analysis explores various strategies implemented by HR professionals to improve this balance, including flexible working arrangements, teleworking, and wellness programs. In conclusion, this HR-focused analysis underscores the importance of work-life balance in modern organizations and emphasizes the strategic role of HR professionals in developing policies that promote a healthy balance between professional and personal spheres, thereby contributing to employee well-being and organizational success.

4 Research Methodology:

This descriptive study seeks to explain the relationship between work-life balance and job performance. Job performance is considered the dependent variable, while work-life balance is the independent variable. Data were collected from primary and secondary sources. For primary data collection, a standardized questionnaire was developed and completed by approximately one hundred employees. Secondary data were obtained from research articles published in various books and journals, as well as from the internet. MS Excel and SPSS software were used for statistical data analysis, including correlation and regression analysis.

Objectives Of The Study : The objective of present study are as follows:

1. To understand the impact of work-life balance on employee performance.
2. To measure the impact of work-life balance on employee performance indicators, such as job satisfaction, productivity, and engagement.

Hypothesis :

1. H1 : There is significant relationship between work life balance and employee performance among manufacturing workers.
2. H2 : There is significant impact of work life balance on employee performance.

Scope of The Study:

The study was conducted in Manufacturing Industries in Satara Tehsil to gather the data. This study will help to know about the work life balance on employee performance at Satara MIDC industries. This research work will be conducted to analyse employee performance in Satara MIDC industries. Research will be confined to Satara. This study will help us to know the work life balance on employee's performance in the Manufacturing sector.

1.5 Result & Analysis:

Reliability Analysis of Schedule:

Cronbach's alpha value for employee performance is 0.895 and for work life balance is 0.851. In above cases the value lies between .7 and .9 that indicates that there is internal consistency in the questionnaire.

Demographic Analysis:

Table 1 depicts the demographic analysis of the respondents. It shows that out of total 100 respondents, 64 are male and 36 are female. According to the age wise category of respondents there were 72 respondents lies between the age group of 20-30 years, 21 respondents were from the age group of 30-40 and 7 respondents were from the age group of 40-50 years.

Table 1 : Demographic Analysis

Gender	Variable	No. of Respondents
1	Male	64
2	Female	36
	Total	100
Age		
1	20-30	72
2	30-40	21
3	40-50	07
	Total	100

Hypothesis Testing:

Hypothesis 1 : Table 2 depicts the Correlation Coefficients among the variables under investigation is analyzed.

Table 2: Correlations analysis

		Work Life Balance	Employee Performance
WLB	Pearson Correlation	1	.915**
	Sig. (2 - tailed)		.000
	N	100	100
EP	Pearson Correlation	.915**	1
	Sig. (2 - tailed)	.000	
	N	100	100

****.** Correlation is significant at the 0.01 level (2-tailed).

This table shows that the results are significant. The Correlation should be between -1 and +1 and the result of Correlation is 0.912. The significant value should be less than 0.05 and the value is 0.000, therefore H_A is accepted. There is a strong Correlation between worklife balance (Independent variables) and Employee performance (Dependent variable).

Hypothesis 2

Table 3: Regression Analysis

Model	R	R Square	Adjusted R Square	Standard Error
1	.915	.834	.833	4.85251

a. Predictors: (Constant), WLB, EP

Table no. 3. provides the R, R square, adjusted R square and standardized error of estimate which can be used to determine how regression model will fix the data. In the above table, the Adjusted R square value is 0.833. This means that 83% of Work life balance is significantly related with Employee performance. 83% of changes on Employee performance as a Dependent variable are explained by work life balance practices.

Table 4: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
1	B	Std. error	Beta		
Constant	.850	1.134		.750	.460
WLB	.971	.044	.915	21.978	.000

we can predict our regression function as,

$$Y = a + b X$$

$$EP = .847 + (.968)WLB$$

Where,

Y = Dependent variable (employee performance) X = Independent variable (work life balance)

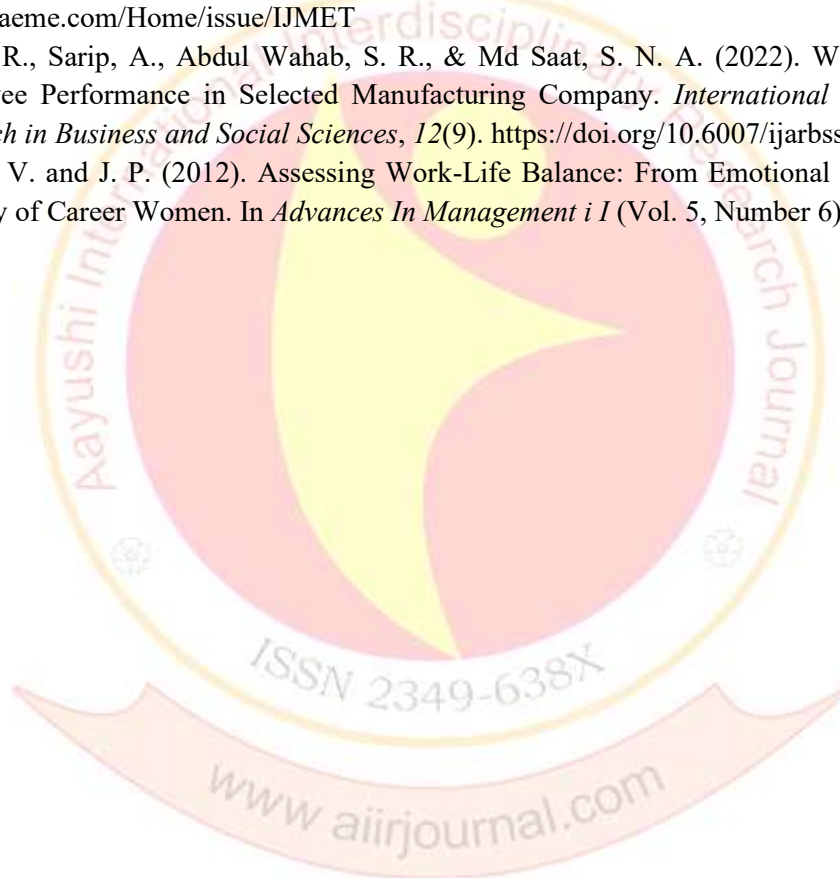
1.6 Conclusion :

The main findings of the study are derived from the responses received. Pearson correlation and regression analysis applied to the underlying hypothesis revealed a relationship between work-life balance and employee performance. The results showed a positive correlation between these two factors. The research demonstrated that work-life balance alone cannot explain the impact on employee performance. These results corroborate and confirm previous studies on the correlations between these two variables. They offer a concrete example in the manufacturing sector, which can serve as a basis for organizations and future research on improving performance through a harmonious and positive work environment. Employee performance can be improved by implementing work-life balance programs, such as employee wellness and assistance programs. Other practices, such as mentoring and psychological support, are also important for motivating employees, as they allow them to receive valuable guidance and support. Implementing these techniques can improve both individual motivation and performance. Employees who enjoy a healthy work-life balance are more productive and contribute more to the organization's success. Furthermore, a good work-life balance fosters motivation and productivity.

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A Study on Consumer Behaviour on The Purchase of Gadgets on The Online Platforms in Haveri City of Karnataka

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Abstract

The study is based on the survey conducted on consumer behaviour patterns relating to online purchases of gadgets in Haveri city of Karnataka. As the e-commerce is growing at a very faster rate in India, understanding local consumer preferences, purchase motivations, influencing factors, and barriers is critical for retailers, platform designers, and marketers. Primary data were collected via structured questionnaires administered to 200 respondents in Haveri. Findings reveal that majority of the respondents were of the opinion that they prefer purchasing smartphones on the online platform rather than to purchase them in the physical market as they find convenience in pricing, product variety etc. They also mention about the trustworthiness of platforms significantly influences online gadget purchases. The demographic factors such as age, education, and income also affect buying behaviour. The paper concludes with insights for e-commerce marketers and recommendations to enhance consumer purchase experience.

Key words: Consumer behaviour, Online purchase, Gadgets, Trustworthiness, Convenience in pricing

1. Introduction

The term consumer *behaviour* refers to the way that you act or behave to mean. Consumer behaviour is the study of how the individuals, groups or organizations buy, use and dispose of goods and services or experiences to satisfy needs, driven by a complex mix of psychological, social, cultural, personal and economic factors which is crucial for businesses to tailor marketing and products effectively. This process involves understanding the decision-making process from recognizing a need to post-purchase evaluation, to better serve customers and increase sales. Schiffman defines consumer perception as “the process by which an individual selects, organizes, and interprets stimuli into a meaningful and coherent picture of the world.” *Customer perception* may be understood as “a marketing concept that encompasses a customer’s impression, awareness, and consciousness about a company or its offerings.” It is shaped by multiple factors such as advertising, reviews, public relations, social media, personal experiences, and word-of-mouth communication. Among the key determinants of shopping behaviour are consumers’ perceptions of **price, value, and quality**.

The Internet has drastically changed the way consumers shop for goods and services, emerging as a global phenomenon. Many companies have adopted electronic commerce (E-commerce) not only to reduce marketing and operational costs—thereby offering competitive prices—but also to strengthen customer engagement. Online platforms enable firms to share information, promote products, sell directly, collect feedback, and conduct satisfaction surveys. From a consumer’s perspective, the Internet offers more than just the convenience of online purchasing. It enables easy comparisons of prices, product features, and after-sales services across multiple sellers. While much of the revenue in online transactions is still driven by business-to-business (B2B) commerce, business-to-consumer (B2C) commerce has also grown steadily. More than a decade since its evolution, B2C E-commerce continues to attract research interest, as scholars and practitioners seek deeper insights into consumer behaviour in cyberspace. With the rise of **E-retailing**, researchers have attempted to explain consumer behaviour by adapting traditional models of decision-making to the online environment. Many new factors and assumptions have emerged, reflecting the unique nature of digital shopping. Within this context, the present study aims to explore consumer perception towards purchasing gadgets through online platforms.

The drastic increase of digital technologies has transformed retail ecosystems globally, with online platforms playing a pivotal role in consumer purchases. In India, rising internet penetration, smartphone adoption, and affordable data have accelerated e-commerce adoption. Consumers increasingly prefer purchasing gadgets such as smartphones, smart watches, and accessories online due to competitive pricing, convenience, and broader product options.

Haveri, a tier-3 city in Karnataka, reflects this transition where traditional retail and digital commerce co-exist. This study examines the behavioural patterns of consumers in Haveri city when purchasing gadgets via online platforms.

2. Literature Review : Consumer behaviour in online markets has been extensively studied.

- **Kumar & Kashyap - (2018)** - In India, regional studies indicate that urban and semi-urban consumers value both convenience and brand reputation when buying electronics online (Kumar & Kashyap, 2018). However, research specifically in the context of secondary cities like Haveri remains limited.
- **Samuel Vanlalzuata (2021)** - The Researcher finds the customers' brand reliability also attracts a lot of customer in two-wheeler market as per that in Aizawl city. The study reveals that the preference pattern plays an important role when it comes to buying of two-wheeler. The participation of the two-wheeler owners in the research helps us knowing the purpose of the buying two-wheeler and let us knows that the preference pattern matters a lot.
- **Dr.M.Kotteeswari (2021)**- As per the author that the customers are giving priority to products which suits their personality and financial position is also playing a very important role in selecting the personal care products. The consumers are very particular in buying the products which suits their personality. The second factor deciding their selection is their financial position. Next they are gathering information about the products before making their buying decision. Even though many products are available in the market they are giving preference to the branded products. But the same time they are looking for the products available in discount also. The consumers are asking other opinion regarding the performance of the product before buying the personal care products. They feel that personal care products are not much more important to decide others status.

3. Research Objectives

1. To identify key factors influencing online gadget purchase decisions in Haveri city.
2. To examine demographic influences on online gadget buying behaviour.
3. To propose recommendations for e-commerce platforms and marketers.

4. Limitations of The Study

This research is a micro-level investigation that focuses only on Haveri only. Hence, the generalizability of the research findings to other regions remains uncertain. The data collected via fieldwork relies on the recollections of the participants.

5. Methodology

5.1 Research Design

A descriptive research design was used. The study relied on **primary data** gathered through a structured questionnaire.

5.2 Sample and Sampling Technique

The sample comprised **200 respondents** residing in Haveri city, selected using **convenience sampling**. Respondents included students, working professionals, and homemakers aged 18–60 years.

5.3 Data Collection

Data were collected through face-to-face and online surveys during a four-week period. Questions covered:

- Online shopping frequency
- Preferred platforms (e.g., Amazon, Flipkart)
- Preferred gadgets

- Purchase motivations
- Barriers to online purchases
- Demographic profile

5.4 Data Analysis

Data were analyzed using descriptive statistics (percentages, mean values) and cross-tabulation to observe patterns across demographics.

Table 1: Age-wise distribution of respondents

Age Group	No. of Respondents	Percentage
Below 18	10	5
18-30	110	55
31-45	60	30
46-60	20	10
Total	200	100

Chart no.1 Age-wise distribution of respondents

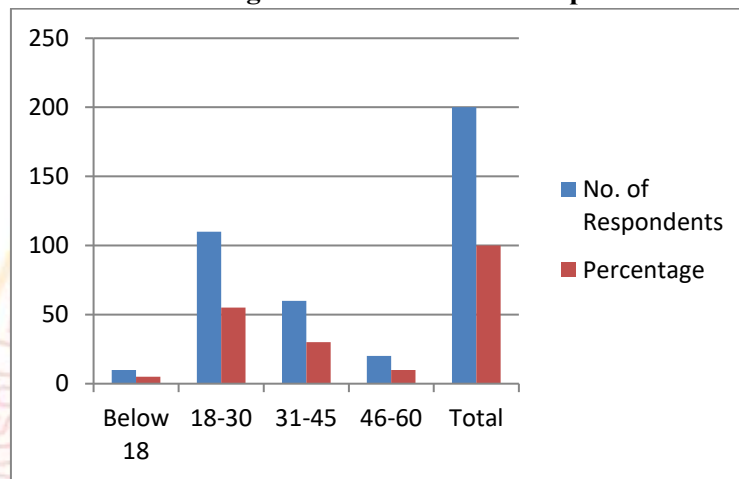
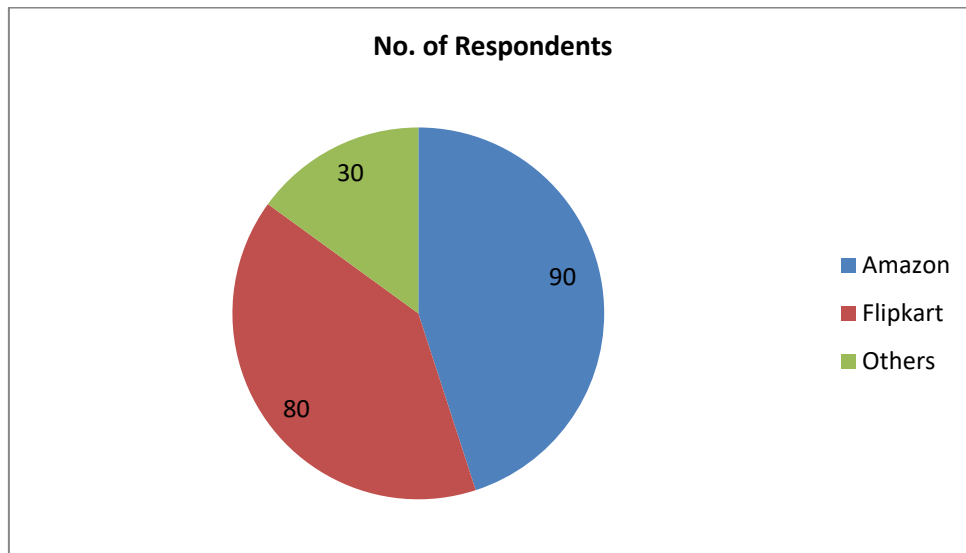


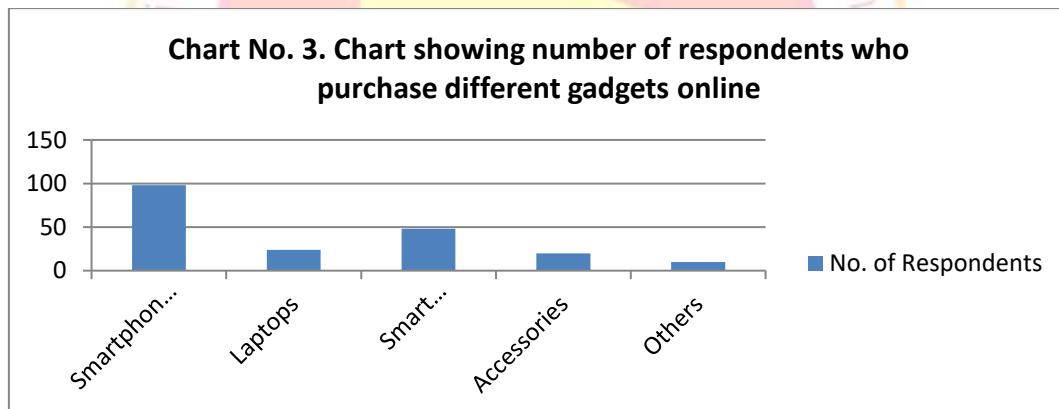
Table 2: Preferred online platform

Platform	No. of Respondents	Percentage
Amazon	90	45
Flipkart	80	40
Others	30	15
Total	200	100

Chart-2 Preferred Online platforms

**Table 3: Preferred online gadgets purchased most online**

Gadgets	No. of Respondents	Percentage
Smartphones	98	49
Laptops	24	12
Smart watches	48	24
Accessories	20	10
Others	10	5
Total	200	100



6. Findings

6.1 Demographic Profile : The respondents for the survey consists 55% were aged between 18 to 30 years of age. Since majority of the young generations are well versed with the technological aspects, major part of the population was of that category only. And it is followed 30% of the respondents were between the age of 31–45 years. The remaining 15% of the population were above the age of 45 years. Among the respondents 60% were male and 40% female. The majority had completed undergraduate or graduate studies.

6.2 Online Purchase Frequency : 70% of the respondents reported purchasing gadgets online at least twice a year. That means they will purchase gadgets more than two times a year or at least two times a year. The middle aged respondents were major part in this category. 20% of them buy the gadgets online frequently. The younger generation respondents often visit online sites and purchase on a frequent basis the not only the gadgets and also the other items. The rare category is one who purchase the gadgets online very rarely. The majority respondents of above the age of 45 purchase the gadgets very rarely.

6.3 Preferred Online Platforms : Among the platforms Amazon ranks number one with 45% share while Flipkart also a little behind ranks second with 40% and others like Myntra, Reliance digital etc have also some share of 15%. Among the online platforms, the customers prefer to purchase through Amazon and Flipkart as the reason were their services and offers. The buying becomes easy in purchasing on these platforms. The trustworthiness is also has the major point in the purchasing the goods through these platforms.

6.4 Preferred Gadget Online : In these days majority of the consumers use the mobile phone as the market to purchase anything online. Hence majority of the respondents prefer to purchase smart phones online as they can view the different companies' mobiles on a fingertip and they can also compare the articles very easily by simply sitting at home at any time they wish. Hence the majority of the customers in this research which is 49% of the total prefer to buy smart phones online. The next rank comes the purchase of smart watches which counts to 24% and laptops are also purchased online by 12% of the population. In case of accessories like Bluetooth, Airpods, Fast Mobile Chargers, Power banks are also bought which comes to 10%.

6.5 Motivating Factors : When we went to find out the motivational factors behind the purchase of gadgets online, very interesting facts were found. Most customers prefer to purchase gadgets online as they feel price competitiveness. In every purchase price plays a vital factor. In this case also price competitiveness played a very important role as the Mean score shows 4.5. As we have already mentioned the variety of products available online also plays an important role as its Mean value is 4.3 which is as good as the price factor. The other factor namely convenience of delivery too makes a huge impact as customers are very much addicted to buy the products by simply sitting in home. They prefer buying the goods sitting in the home. In this case it also gets 4.1 Mean score. Even discounts offered on the online platforms are very much attracting the customers to buy online only. These domains give the offers during the normal days also. The offers and discounts allowed on the festive seasons will be awesome. So customers will be attracted to these offers and will be motivated to purchase. Nowadays the trustworthiness of the online platforms also showing a good feedback as these domains are getting the confidence of the customers so much that the customers now are believing more on the online rather than the physical market dealers.

Respondents rated influencing factors on a 5-point scale:

Factor	Mean Score
Price Competitiveness	4.5
Product Variety	4.3
Convenience of delivery	4.2
Discounts and Offers	4.1
Trustworthiness of platforms	3.9

6.6 Barriers to Online Purchase

It is not the positive aspects that are there in online markets, but there are some sorts of deficiencies also in the online markets. Everything which is sold online will not be the good one or the quality product. Customers worried about the product authenticity sold over online. Major percentage of the population worried about the authenticity of the product. They also show the concern over the delays in delivery of the goods. Sometimes it so happens that the delivery will be made very late over the date is mentioned. Customers when they require it very urgently feel very bad over the delays made. Customers will not be in a position to check the quality of the products physically until they receive the goods. Hence they hesitate to order the goods when quality check is very much required for the particular product. When the goods are being purchased the sellers treat the customers as the God, but when the customer wants to return it, there will be different policies which the majority of the customers will be unaware of. Due to the complex return policies, some customers hesitate to purchase unless until they knew about the product perfectly.

Key barriers identified:

- Concern over product authenticity (32%)
- Delivery delays (28%)
- Preference for trying products physically (25%)
- Complex return policies (15%)

6.7 Demographic Influences

As we all know the new generation are very conversant with the technology. The customers between the ages of 18 to 30 are the highest level of customers who purchase online because they are well versed with the online platforms, the new types of products, the new trends in the markets. Hence the frequency of transactions are more by the younger generation people.

The higher income group customers have the greater trust on online markets over the physical markets. The frequency of purchases are also be in a greater portion by the above class of customers. The study also reveals that female respondents give the priority for the secure payment system over the male respondents.

The data suggest that price, variety of products and convenience are the most significant drivers for online gadget purchases in Haveri. Trustworthiness and platform reputation also play a critical role, reflecting broader trends in digital commerce research. The preferences indicate that while online shopping is popular among youth and working professionals, older consumers remain cautious, often due to concerns about authenticity and post-purchase support.

7. Recommendations

For E-Commerce Platforms

1. It is suggested to enhance trust mechanisms and improve return policies and offer verified seller badges.
2. Localized marketing: Tailor promotions and offers specific to Haveri's consumer segments.
3. Faster delivery networks: Partner with local logistics providers to reduce delivery time.

For Consumers

1. It is suggested to the customers to be very much aware of secure payment tools and to use **trusted payment gateways**.
2. It is also suggested to review product warranties given before placing the orders. If the keen observation is made regarding warranties while placing the orders, it will be very less difficulty in returning the products.

8. Conclusion

This study highlights that consumer behaviour in Haveri city leans increasingly towards online channels for gadget purchases. Price competitiveness, variety of products, convenience, and platform trust are prime motivators, while authenticity concerns and return challenges remain barriers. Demographics significantly influence buying behaviour, underscoring the need for targeted strategies.

Future research could expand the sample size and include comparative analysis with offline gadget purchase behaviour.

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3. International Journal of Creative Research Thoughts (IJCRT)- Vol-9-Issue-4 – April-2021-ISSN-2320-2882- Dr.M.Kotteeswari- 'A study on consumer behavior in selection of personal care products based on their financial status' - Assistant Professor Department Of Commerce Sastha Arts And Science College Chennai.

A Study of Government Initiatives for Artisans in Kolhapur District

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Abstract:

Artisans are an important part of the preservation of cultural heritage and play a vital role in rural economy of India. In Kolhapur district, a famous place for its rich craft heritage such as Kolhapuri chappals, metal crafts, and handlooms. The artisan communities are facing issues related to market, technology, and finance. This paper aims to study the effectuality of government policies in supporting various types of artisans in Kolhapur district, particularly in terms of financial support, skill enhancement, infrastructure development, and marketing support. By using secondary data collected from government reports and various research publications and websites for the purpose of the study, the study evaluate various government initiatives for enterprise management and entrepreneurial development of artisans businesses. The results revealed that although specific financial initiatives have improved credit accessibility and facilitated business expansion for artisans, there are still some gaps in awareness, timely disbursement of funds, and connecting artisans with digital markets. The paper emphasizes varied effects of these initiatives on different crafts and the requirement for specific policy interventions to focus on skill enhancement, value chain connectivity, and sustainable market integration. This study will help in development of the craft sector.

Keywords: government initiatives, artisans, business performance, cultural heritage, artisan communities.

1. Introduction:

Artisans are one of the key contributors to the unorganized sector in India, and their contribution is not only in the form of employment generation but also in the form of preserving the cultural heritage (Rai, 2017). The handicrafts and artisans sector is an integral part of rural and semi-urban development, as it generates livelihood for millions of artisans (pib.gov.in, 2025). Despite the presence of various government programs, artisans continue to experience managerial issues concerning enterprise planning, finance, production efficiency, marketing, and sustainability (Bolake, R. N., 2015). Taking into consideration the significance of this sector, the Government of India and state governments have initiated various programs to help the artisans in terms of financial assistance, skill development, infrastructure development, and market development (pmvishwakarma, 2023). From a managerial point of view, the success of government programs is not only dependent on their presence but also on their effectiveness in improving artisans' management capabilities to manage their enterprises as a business unit. The factors like of awareness, complexity, marketing, and institutional coordination are often responsible for limiting the effective use of government programs. (More, 2025)

The Kolhapur district in the state of Maharashtra is known for its various artisan communities, including leather artisans who make Kolhapuri chappals, metal and brass artisans, handloom weavers, potters, and wood artisans(kolhapur.gov.in/en/economy/). Although these artisan communities have vast market potential, they are struggling to survive and are not oriented towards management. The government initiatives in the district are aimed at promoting entrepreneurship among artisans through improved financial inclusion, skill development, and market access. However, the efficacy of such initiatives in enhancing management practices and performance is not well understood. The existing literature on artisan development is largely focused on the socio-economic issues, cultural preservation, or policy description, and less attention is paid to analysis of government support from the management perspective. In this context, the present study proposes to carry out an analysis of government support for various categories of artisans in

Kolhapur district, with a view to examine the government support for enterprise management and entrepreneurial development.

1.1 Research Question:

In which types of government programs the artisans are supported in financial planning, improvement in production efficiency, quality management, and reach the global market?

2. Review of literature:

2.1 Bolake, R. N., (2015), in his research study entitled as “*Impact of New Economic Policy on the Business of Village Artisans with Special Reference to Kolhapur*” revealed the impact of new economic policy on the business of village artisans. The government provides facilities for improve skills which showed a positive impact on artisans. However new generation from these artisans families prefers job outside and the government policies dosen't impact on the artisans businesses. He suggested that, the government should provide assurance on the appropriate pricing for artisan's products to increase their business profitability.

2.2 DibyenduBikashDatta and Sankhadip Bhattacharyya, (2016), in their study “An Analysis on Problems and Prospects of Indian Handicraft Sector” discussed about the growth of handicraft sector and mentioned the problems of artisans. They concluded that, artisans face many problems such as poverty, illiteracy, ignorance, dependency on middlemen, finance and market issues etc. Artisans have potential for growth due to chief and abundant skilled manpower.

2.3 Kamble A. S. and Patil V.A.,(2014), in their research paper “A Study of Socio-Economic Status of Artisans of Burud Community in HatkanangleTaluka, (District Kolhapur)” revealed that, economic status of burud artisans are changing but they have no any other sources of income. The researcher suggested that, the government should provide financial facilities for artisans and artisans should take training for innovative production.

3. Research Objective: Present study has undertaken with following objective.

1. To study the government initiatives for artisans enterprise management and entrepreneurial development.

4. Research Methodology:

4.1 Data base: The secondary data has been used for this study.

a) Secondary data: Secondary data have been collected from the literature available on different sources, that includes research journals, articles, theses, books, annual reports, guidelines of government schemes report, report on craft council, websites, etc.

5. Concept of Handicraft and Artisan:

a) Handicraft: Indian handicrafts are usually defined as “Items made by hand, often with the use of simple tools and are generally artistic and/or traditional in nature. They are also objects of utility and objects of decoration.” (P. Abirami, 2017)

“Handicraft can be defined, which is made by hand; should have some artistic value; they may or may not have functional utility.” – Government of India (P. Abirami, 2017)

b) Artisans: An artisan is a person with special hand skills, often handed down traditionally across generations, and often linked to a complex traditional knowledge system encompassing the material, technology and / or design aspects. (Report on craft council of India, 2011)

6. Government initiatives for artisans:

I) Geographical Indication (GI) Tag

“Article 22.1 of the TRIPS 1999 Agreement defines GI As, 'a geographical indication is a sign used for a product that have a specific geographical or aria origin and possesses qualities or reputation that are due to

that origin.” GI tag protects handicrafts under the act of 'TRIPS1999,' and it gives handicrafts special rights for 10 years. Once the time of ten years is complete, then the handicraft or art has to be re-registered and will be extended for the next 10 years.” As of today, 'Kolhapuri Chappal' has been awarded GI rights in the year 2019, and this right will be used by artisans till the year 2029. Because of GI, this right will protect patents, designs, and trademarks. (Kharat, A. S, 2025)

II) PM Vishwakarma Scheme:

‘PM Vishwakarma, a Central Sector Scheme, was launched on 17th September, 2023, by Hon'ble Prime Minister to provide end-to-end support to artisans and craftspeople who use their hands and tools.’ (www.india.gov.in/spotlight/pradhan-mantri-vishwakarma-scheme). It is stated that the ‘PM Vishwakarma is a Holistic Scheme which envisages to provide end-to-end support to the artisans and craftspeople through the following component’ a. Recognition: PM Vishwakarma Certificate and ID Card

1. Skill Upgradation
2. Toolkit Incentive
3. Credit Support
4. Incentive for Digital Transactions
5. Marketing Support. (<https://pmvishwakarma.gov.in>)

III) National Handicrafts Development Programme (12th Five Year Plan)

National Handicrafts Development Programme was established in the backdrop of the 12th Five Year Plan and was implemented by the Office of the Development Commissioner, Ministry of Textiles to undertake the task of allocation of a variety of factors which would be required to address the issues and challenges being faced by the handicraft sector in the country. It aims at promoting artisans to register their names in federations or SHGs, providing training, conducting workshops to create new designs, learn marketing and export promotion techniques, etc. At the implementation stage of the programme, there are 7 components aimed at scaling up the technological assistance for their enhanced productions. (KanuPriya, 2023)

1. Marketing Support & Services
2. Skill Development in Handicraft Sector
3. AmbedkarHastshilpVikasYojana
4. Direct Benefit to Artisans [Welfare]
5. Infrastructure and Technology Support
6. Research & Development
7. Comprehensive Handicrafts Cluster Development Scheme (CHCDS). (KanuPriya, 2023)

IV) Artisans Employment Guarantee Scheme:

The Scheme is implemented in the State since 1972-73 with joint co-operation of Reserve Bank, Maharashtra State Co-op Bank, State Government, and Khadi & Village Industries Commission. The traditional industries, namely, pottery, Carpentry & Black smithy, Leather, Faber, Cane & Bamboo, Processing of Cereals Pulses, Wool, Village Oil, etc., traditionally found in rural areas, have been included under this scheme. However, with the span of period, considering employment situations, traditional craftsmen of some other village industries have also been included under this scheme. The members of Balutedar societies, it is expected, will provide them with necessary financial assistance in the form of composite loan and cash credit facilities through Dist. Central Co-op. Banks under NABARD Refinance Schemes. (Maharashtra State Khadi and Village Industries Board, Mumbai, 2018-2019)

V) SFURTI:

The Scheme of Fund for Regeneration of Traditional Industries has been operational since 2005-06 for making Traditional Industries more productive, market-driven, and competitive through the organizing of Traditional Industries and artisans into clusters. This scheme has the following objectives to be achieved

through need-based assistance for replacement of equipment for production, establishment of Common Facility Centres, product development, quality development, marketing, and capacity development, etc., through the financial assistance provided by the Government. During 2016-17, the scheme was revised and is now called the revamped SFURTI scheme. (<https://www.pib.gov.in>)

VI) Khadi and Gramodyog Vikas Yojana (KGVY):

By amalgamating all the existing schemes/sub-schemes/components under the umbrella of “Khadi Grant” and “Village Industries Grant” with the proposed sub-schemes of “Khadi Vikas Yojana” (KVY) and “Gramodyog Vikas Yojana” (GVY), as above the KGVY was established. Khadi and Village Industries Commission (KVIC) also organizes National Level Exhibitions and State Level Exhibitions where these entrepreneurs can sell their products through the KVIC. The entrepreneurs and artisans who are engaged in the production of unique and quality products are also provided financial assistance to participate in the International Exhibitions. (<https://www.pib.gov.in>)

- i) **GramodyogVikasYojana (GVY) - this scheme was launched for** promotion and development of village industries through common facilities like technological modernization and training, etc., other support services for promotion of village industries. (<https://www.pib.gov.in>) GVY would have the following components:
- b) **Pottery Programme (KumharSashaktikaran):** Under this program, KVIC identifies areas where clusters of traditional pottery workers are available and provides training to them along with provisions of electric pottery wheels and other necessary equipment like blunger, Pug Mill, etc. (<https://www.pib.gov.in>)
- c) **Empowerment of Leather Artisans:** In order to provide employment and earn income for the leather artisans, KVIC has launched Artisan Empowerment Leather Craft Programme during the year 2019-20 with a target of 9800 artisans to be trained in the country. (<https://www.pib.gov.in>)

VII) Kalapuri Foundation:

Kalapuri foundation work to enhance artisans' livelihoods and empower them by providing them with access to markets and resources. Apart from access to a wider market, Kalapuri Foundation facilitates training and support for artisans. The organizations help artisans build their skills, develop new products, and promote their businesses. Artisans in Kalapuri Foundation are also ensured of good pay for their work, implementing proper safety and hygiene in the working environment. Kolhapuri Chappal, Kolhapuri Jewellery, Terracotta Handicraft, Handmade basket these are 4 clusters worked with the kalapuri foundation. (<https://kalapurifoundation.org>)

7. Findings:

Despite facing many difficulties, Kolhapuri slipper artisans are able to sustain their identity in the market. Because of the GI certification given to Kolhapuri, the artisans are able to sustain their livelihood by understanding the need for the designs in demand and creating them accordingly. (Kharat A S, 2025)

Big exhibition/conferences not only benefit the seller directly but also the buyers. Big exhibition/conferences will increase the income levels of the participants. (Patil P N, 2020)

Kolhapuri Saaj is the speciality of Kolhapur and is being exported to countries like America and Australia. This industry has an annual turnover of crores of rupees and requires thousands of artisans and traders in and around Kolhapur. KolhapuriChappals are mainly exported to countries like China, Japan, France, and Australia. (kolhapur.gov.in/en/economy)

It is found that the benefits of government schemes are not extended to the majority of artisans due to a lack of awareness about them, illiteracy, restrictions on the reach of government schemes in rural areas, corruption, delays in loan sanctions, a lengthy and time-consuming process involved in sanctioning a loan, and the complication of the documents. (Bolake R N, 2023)

The related government scheme provides the new machinery required to these artisans but the potter artisans themselves do not innovate the product. (Kumbhar R V, 2019)

8. Conclusion:

Role of the government initiatives is crucial in the development of artisan's business and improve their livelihood. Government has provides financial, production and marketing support to the artisans through various schemes and programmes. Primarily, the intervention of financial programs such as Pradhan Mantri Mudra Yojana (PMMY), SFURTI, and Artisans Employment Guarantee Scheme are helping the artisans for financial planning. Skill development programs of PM Vishwakarma, Gramodyog Vikas Yojana (GVY), district handicraft training centres have moderately helped the artisans with improvement in production efficiency as well as quality management. Marketing support intervention through PM Vishwakarma exhibitions, One District One Product (ODOP) scheme (handicrafts of Kolhapur), state-sponsored exhibitions/trade fairs, and National Handicrafts Development Programme has been helpful to the artisans for exploring the market beyond their regional boundaries. It is observed that the limited awareness, complicated documentation, and financial illiteracy some artisans are unable to take advantage of government initiatives.

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The effect of Skill Development Programs on the youth employability in India: A case study of Karad Tehsil

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Abstract

The fast growing youth market in India is both a promise and a challenge to the creation of employment. Development of skills has now come into the limelight as a central Human Resource Development (HRD) strategy that is geared towards increasing youth employability. The Government of India has initiated a myriad of programs, including Skill India Mission, Pradhan Mantri Kaushal Vikas Yojana (PMKVY), and National Skill Development Corporation (NSDC), which are aimed to impart vocational training and industry-oriented competencies. This is an empirical study that aims to assess the impact of skill development initiative on employability of the youth in Karad Tehsil on the Satara District. The primary data collection was done on 150 youth respondents who had attended different skill training courses. The evaluation will involve awareness levels, skills improvement, job opportunities, and the post-training income patterns. The results showed that the skill development programmes have a positive impact on the employability, self-confidence, and job preparation among the youth cohort. Nevertheless, the remaining challenges such as limited accessibility of rural areas and insufficient placement assistance still undermine the progress. The paper concludes by stating that skill development programme is a must to achieve the vision of Viksit Bharat by strengthening human capital and curbing unemployment.

Keywords: Skill Development, Employability, HRD, Youth, Karad Tehsil, Viksit Bharat.

1. Introduction

India is one of the youngest nations in the world where over 60 percent of the population consists of individuals below 35 years. This demographic can be of great importance to the economic development in case the young are offered the relevant skill sets. Nevertheless, the problem of unemployment and underemployment are also topical because of the lack of correspondence between the educational level and the needs of the industry. Human Resource Development (HRD) focuses on improving the skills, knowledge, and capabilities of people in order to improve their productivity and socio-economic development. In this context, skill development programmes form a very important part of HRD strategies in India. Understanding that, the Government of India launched such programs as the Skill India Mission in 2015, which is targeted at the training of millions of young people in various fields.

Satara District, Karad Tehsil is a rural and semi-urban community with almost all the opportunity of employment among the young people being limited to agricultural, small-scale manufacturing, service and self-employment. There are several government and privately run skill development centres in the area that provide vocational training in such trades as electrical work, computing, tailoring, automobile repair and hospitality. The vision statement of Viksit Bharat 2047 highlights the need to have skilled human resource to facilitate sustainable economic growth. Skill development is considered as one of the main aspects in order to cover this vision through enhancing employability, entrepreneurship and making the grassroots level more productive.

2. Statement of the Problem

The presence of a wide range of skill development programmes within Karad Tehsil has not helped the situation with a significant percentage of young residents still putting up with unemployment or underemployment. Although there are training programmes, their practical effectiveness in improving

employment opportunities and income rates is not clear. Lack of modern infrastructure, poor awareness in rural settlements, lack of placement support and the mismatches between training material and the local labour market requirements are some of the factors that negatively affect the success of such programmes. Therefore, there is an urgent need to examine how skill development initiatives help improve the youth employability in Karad Tehsil and what the key challenges facing the participants are.

3. Objectives of the Study

1. To test on the conscious of skill development programmes among Karad Tehsil youth.
2. To examine enrolment to skill training programmes.
3. To determine the effect of skill development on employability.
4. To examine the change in the levels of income following training.
5. To establish issues affecting the youth in skill development programmes.

4. Research Methodology

Research methodology refers to the procedural steps that are embraced to the gathering, analysis, and interpretation of data, and the eventual purpose of the investigation. The current investigation will follow a strict, systematic model to examine the extent of the skill development programme on the employability of the youth in the Karad Tehsil.

4.1 Research Design

The research question involves the descriptive-analytical research design to analyze the present scenario and impact of skill development programmes on youth population of Karad Tehsil. The descriptive part can be used to identify the current levels of awareness, rates of participation, and employment, whereas the analytical one will enable to research the connection between training exposure and other employability indicators including job opportunities and income increases. The study setting is Karad Tehsil, Satara District, Maharashtra which comprises rural and semi-urban localities where employment of youth is based on agriculture, small-scale industry, service sector, as well as self-employment. The fact that there are numerous governmental and privately owned skill development training centres makes the area suitable in the investigation. The target market is the people of Karad Tehsil aged between 18 and 35 years old who have attended government-sponsored or privately run skill development programmes within the past years.

4.2 Sample and Sampling

The study population will be a sample of 150 respondents as it will be considered to be enough to represent the young demographic of Karad Tehsil and provide significant results on the effect of the programmes. The sampling method was convenience sampling due to the time limitations and accessibility. The participants were selected in different rural and urban areas of Karad Tehsil, including individuals enrolled in government training centres, ITI institutions, and vocational training institutions in the private sector, and in NGO skill development programme. It was an effective sampling method that facilitated the collection of data in an effective way through a range of training backgrounds in the field.

4.3 Sources of Data : The investigation is supported by both primary and secondary sources of data. Primary data were obtained through direct elicitation of the respondents through a structured questionnaire that included variables of personal profile (age, education, type of training), awareness of the programme, skill improvement after the training, employment status, change in income, and the challenges that were experienced. The majority of the items were based on 5 point Likert scale to quantify the perception of the respondent. To support and frame the analysis, secondary data were gleaned in various repositories, such as government reports related to the Skill India Mission and PMKVY, peer-reviewed journals and monographs on the topic of Human Resource Development and skill training, and official web portals by the Ministry of Skill Development and Entrepreneurship.

4.4 Data Analysis, Research Instrument and Tools : The main research tool was a structured questionnaire with closed-ended questions to simplify analysis. Perceptions were evaluated by Likert scale statements, which extended between Strongly Agree and Strongly Disagree and, to determine demographic data,

multiple-choice questions were used to support this. Pilot test was done using a small group of respondents to guarantee comprehensibility, relevancy and dependability. Analysis of the data was performed with simple and yet suitable statistics, such as calculation of percentages, mean values, and standard deviations. Both table and graphical reports including bar charts were used to explain the trends and clarify how the study variables impacted it.

4.5 Limitations of the Study

1. The area of the investigation is narrowed to Karad Tehsil.
2. A population of 150 respondents might not be representative of the entire youth population in the country.
3. There are possibilities of bias through convenience sampling.
4. Response data indicate individual views of the respondents.

5. Analysis and Interpretation of Data.

5.1 Skill Development Programs Awareness.

The knowledge of the skill development programmes is the crucial factor in determining the effectiveness of the governmental programs and the outreach mechanisms within the youth population. Increased awareness is normally associated with increased participation and usage of provided training opportunities. Based on this, the questionnaire was filled with the skill development programme such that, the following question was included, Are you aware of skill development programmes available to youth in Karad Tehsil to measure the level of awareness.

Table 1: Skill Development Programs Awareness.

Response	Number	Percentage
Highly Aware	60	40%
Aware	55	37%
Neutral	20	13%
Not Aware	15	10%
Total	150	100%

Interpretation:

This table shows that 40% of the respondents are highly conscious and 37% are conscious of the programmes meaning that 77% of them have a sufficient knowledge of such initiatives. This implies that awareness activities have achieved moderate success in Karad Tehsil. However, one-fifth of the respondents are indifferent or uninformed, which implies the absence of communication and outreach. This lack of awareness could be attributed to limited exposure to channels of information. The results highlight the need to engage in greater promotional efforts by use of educational institutions and local authorities. On the whole, the level of awareness is good, but it should be improved.

5.2 Post-Training Skill Improvement.

In order to evaluate the effectiveness and quality of skill development programmes, it is important to evaluate the improvement of skills after the training. Employability and job performance are both dependent on skill development. The questionnaire was, therefore, equipped with this question, Skill development training programmes helped me to develop my skills, to understand physical effects.

Table 2: Change in Skills Post training.

Response	Number	Percentage
Strongly Agree	65	43%
Agree	50	33%
Neutral	20	13%
Disagree	15	10%
Total	150	100%

Interpretation:

The statistics indicate that 43 per cent strongly agree and 33 per cent agree that their skills were developed after training showed 76 per cent positive responses. This means that most of the respondents found the training programmes to be effective. The ratio of the neutral answers indicates that not all of those involved in the study had enough skills improved or expected to gain higher training. The 10-percent difference reveals that there might be some problems with course relevance or quality of training. To conclude, the findings support the hypothesis that skill development programmes play a significant role in the skill development of the youth in Karad Tehsil.

5.3 Employment post Skill Training.

The most significant goal of skill development projects is generation of employment. The measurement of employment outcomes thus, will give an avenue to determine the usefulness of such programmes in practice. As such, the questions, Are you employed after completing skill development training? and Have you been employed after completing skill development training, were asked, and they allowed the determination of the post-training employment status.

Table 3: Employment Following Skill Training.

Status	Respondents	Percentage
Employed	95	63%
Unemployed	55	37%
Total	150	100%

Interpretation:

The table shows that 63 percent of respondents had acquired jobs after skills training, which is a positive employment success. This observation means that the training programmes are in line with current market requirements. On the other hand, 37 per cent of the respondents are not employed, which is characterized by difficulties in finding work opportunities and poor assistance in placement. The macroeconomic factors and the lack of alignment between the skills obtained and the nature of the work might also play a further role in the labor market performance. Despite these limitations, the net effect of skills development programs on employment is positive.

5.4 Increase in Income Level

Increase in income is an important pointer towards economic empowerment that is enabled by skill development. As a result, the question; Has your income increased after taking skill development training? was used to measure the financial implications of such programmes.

Table 4: Rise in the Income Level.

Response	Number	Percentage
Yes	90	60%
No	60	40%
Total	150	100%

Interpretation:

The findings indicate that 60% of the respondents indicated that their income improved after the training and this is an indication that there was a growth in their earning power. This is indicative that the skill development programmes have enhanced better employment and remuneration opportunities. However, 40 percent had no increase in income and this may be due to low-wage jobs or unemployment. This emphasises the need to focus more on job quality in equal measure with creation of jobs. On the whole, the skill development programmes have positively impacted the income levels of most percentage of youth cohort.

5.5 Challenges Faced by Youth : It is necessary to understand the problems faced by the participants to improve skill development initiatives. These impediments when identified will help the policymakers and training institutions improve the efficiency of the programs. In this regard, the following query was asked: What were your difficulties during the process of attending skill development programmes?

Table 5: Problems among the Youth.

Challenge	Respondents
Lack of Placement Support	55
Poor Infrastructure	40
Limited Courses	30
Lack of Awareness	25

Interpretation:

According to the table, the most common challenge that the respondents face is the lack of placement assistance, which means that there is a mismatch between the completion of training and jobs. The inadequacy of infrastructure and a lack of courses to provide also undermine the quality and relevance of training. Lack of awareness is also an issue that is still a challenge and it limits the involvement of qualified youth. These observations highlight the need to secure fortified connections of industries, improved infrastructure, and differentiated training programmes.

5.6 Descriptive Statistics : The descriptive statistics can be used to summarize the overall perceptions of respondents in regard to the skill development programmes. Mean values give an insight about the overall level of agreement, but the standard deviations depict the consistency of response. In line with this, descriptive statistics were calculated to determine awareness, skill development, employability, and income increase in youth in Karad Tehsil.

Table 6: Descriptive Statistics of the key variables.

Variable	N	Mean	Std. Deviation
Awareness Level	150	4.10	0.72
Skill Improvement	150	4.25	0.68
Employability	150	3.95	0.75
Income Growth	150	3.80	0.82

Interpretation:

As shown in the table all the mean scores are higher than 3.5 indicating that they have a positive impression about youth in skill development programmes. The value of the highest mean is on skill improvement (4.25), which means that the respondents believe that their skills will significantly improve after training. Awareness also records a large mean (4.10) which indicates good information dispersion on skills development programs. Employability and income increase have relatively smaller but already positive values, indicating average improvements in the employment opportunities and income. The small standard deviations are also a testimony to the area of uniform responses. Overall, the descriptive statistics support the positive effect of skill development programmes in Karad Tehsil.

5.7 Pearson Correlation Analysis : Correlation analysis aids in the study of the strength and direction of the association among key variables that are relevant in analyzing the results of the development of skills. The understanding of these relations helps to understand how awareness and skill development impact employability and income increases. In this way, the correlation analysis conducted by Pearson was accomplished.

Table 7 Pearson Correlation Matrix.

Variables	Awareness	Skill Improvement	Employability	Income Growth
Awareness	1	0.62	0.55	0.48
Skill Improvement	0.62	1	0.70	0.65
Employability	0.55	0.70	1	0.68
Income Growth	0.48	0.65	0.68	1

(Significant at 0.01 level)

Interpretation:

The correlation shows positive and statistically significant results in all variables. There is a moderate positive relationship between awareness and skill improvement (0.62) and employability (0.55), which means the higher the awareness, the greater is the participation and the results. Skill improvement shows that

it has a strong positive relationship with employability (0.70), which highlights the fact that augmented skills develop employment opportunities significantly. Growth in income is also significantly related to the skill enhancement (0.65) and employability (0.68), and it means economic returns on training. These findings support a cascading impact of awareness to the employment and income generation through the skill development programmes, which in turn supports the effectiveness of HRD programs.

5.8 Regression Analysis : The regression analysis is used to test the effect of skill development programmes on employability. It clarifies what percentage of the change in employability can be observed as a result of attending the skill development programs. As a result, the linear regression model was fitted, and the variable where the simple linear regression model was employed is the variable of employability.

Table 8: Summary of Regression Model.

Model	R	R Square	Adjusted R Square	Std. Error
1	0.74	0.55	0.54	0.42

Interpretation:

The value of 0.74 is indicating a strong positive association between the skill development programmes and employability. The coefficient of determination (0.55) indicates how 55 per cent of the variability in employability can be explained by skill development programmes which demonstrates the significant effect of training initiatives on the employment outcomes. The adjusted R² of 0.54 also gives testimony to the reliability of the model. The small standard error shows a high level of predictive power. The overall findings of the regression indicate that, youth employability has been significantly enhanced in Karad Tehsil through skill development programmes.

5.9 ANOVA Analysis

ANOVA is utilized to measure the general significance of the regression model which determines whether or not the independent variable is a statistically significant predictor of the dependent variable. In its turn, ANOVA was used to verify the regression results.

Table 9: ANOVA Table

Model	F Value	Sig.
Regression	180.25	0.000

Interpretation:

The result of ANOVA table shows the F value of 180.25 having the significance value of 0.000. Because the p-value is below 0.05, the regression model is considered to be significant. This result indicates that the programs of skill development have a significant impact on the employability and, thus, proves the effectiveness of the regression results and the purpose of the research. In this connection, the model, which was used in the study, is deemed to be appropriate and reliable.

The analysis of the SPSS clearly shows that skill-development programs at Karad Tehsil have significantly contributed to the development of the skills of the youth, increased their employability and led to growth in income. Close interconnection between awareness, skill improvement, employability and income growth highlights the synergistic effects of training programs. The regression and ANOVA findings also support the key position of skill development programs in increasing the employment rates. This evidence supports the efficiency of the Human Resource Development programs like PMKVY and Skill India Mission on the local scale. All in all, the research highlights the need to strengthen and scale up the skill development initiatives in order to realize sustainable youth employment.

6. Findings

- Karad Tehsil has majority of youths who are knowledgeable on skill development programs.

- Training programs contribute to both technical and soft skills to a significant extent.
- Over fifty percent of those who have undergone training were able to get a job.
- Many of the participants improved their income.

Placement assistance and rural accessibility are still a significant problem.

7. Suggestions

1. Enhance partnering with local industries in job placements.
2. Enhance facilities of training centres of Karad Tehsil.
3. Carry out sensitization at the rural level.
4. Bring in job centered and market oriented courses.
5. Professionalize the jobless.

8. Conclusion

This research concludes that skill development programmes are very important in improving the youth employability in Karad Tehsil. Such programmes are useful to skill development, job creation, and increase incomes of the young people. However, issues like inadequate placement support, infrastructure disconnection, and geographical outreach need to be undertaken to enhance the success of the programmes. Skill development on the local level such as in the example of Karad Tehsil is a necessity to the successful realization of Viksit Bharat at 2047. Through empowerment of the HRD activities, India will be in a position to produce a skilled labor force that is capable of delivering an inclusive and sustainable economic development.

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Digital Transformation in Governance: Opportunities and Challenges.**Mrs. Snehal Amey Desai.**

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Abstract

Digital transformation has changed the way governments operate as well as how they deliver public services. By integrating information and communication technologies into administration, governments are improving transparency, efficiency, and accountability. The study titled "Digital Transformation in Governance: Opportunities and Challenges" examines how digital platforms, cloud computing, artificial intelligence, and data-driven systems strengthen governance processes as well as citizen participation. It also highlights how e-governance initiatives improve access to services in urban areas as well as rural regions.

The research follows a descriptive and analytical approach based on secondary data collected from government reports, academic studies, as well as international policy frameworks. The findings show that digital systems support real-time service delivery along with better coordination among departments. At the same time, challenges such as the digital divide, cyber security risks, privacy concerns, as well as limited digital literacy continue to affect implementation.

The study concludes that digital transformation offers strong opportunities for modernization as well as inclusive governance. However, its success depends on reliable infrastructure, effective regulations, capacity building, as well as ethical use of technology. A balanced approach that combines innovation with inclusive practices is essential for sustainable and citizen-centered governance.

Keywords: Digital Transformation, Digital Governance, Artificial Intelligence in Governance, Big Data Analytics, Sustainable Development

Introduction

Digital transformation has become a key feature of modern governance across the world. Governments are adopting technologies such as cloud computing, big data analytics, artificial intelligence, as well as mobile platforms to improve public administration. This shift from traditional systems to digital governance aims to create service models that are efficient as well as transparent.

With the expansion of internet access and smartphone usage, governments can now provide online documentation, digital identity systems, as well as real-time communication channels. These developments help reduce delays along with bureaucratic complexity. In addition to improving efficiency, digital governance also strengthens accountability as well as citizen participation. In developing countries, it is viewed as a pathway toward inclusive growth as well as better public administration.

Despite these advantages, several challenges remain. The digital divide between urban and rural communities, along with limited technological literacy, restricts equal access. Cyber security threats as well as data privacy concerns further complicate implementation. In addition to infrastructure gaps, resistance to organizational change also slows progress. Therefore, policymakers must focus on ethical technology use as well as inclusive access.

This study explores both the opportunities as well as the challenges linked with digital transformation in governance. It examines how technological innovation improves outcomes while also identifying barriers that need careful attention.

Objectives

1. To understand the concept and scope of digital transformation in governance as well as its influence on public administration.

2. To identify major digital technologies such as e-governance platforms, cloud systems, artificial intelligence, big data, as well as mobile applications.
3. To analyze the opportunities created by digital transformation, including transparency, efficiency, citizen participation, as well as reduced delays.
4. To examine challenges such as the digital divide, cyber threats, privacy concerns, limited digital literacy, as well as institutional resistance.
5. To evaluate the importance of digital infrastructure as well as policy support in successful implementation.

These objectives together aim to provide a balanced understanding of digital transformation along with its practical implications.

Research Methodology : The study uses a descriptive and analytical research design to examine digital governance systems.

Research Approach : The research follows a qualitative and conceptual method supported by selected quantitative insights from published reports. This approach helps in understanding governance models as well as policy frameworks in depth.

Data Sources : The study is based mainly on secondary data collected from:

- Government policy documents as well as e-governance reports
- Academic journal articles
- Publications from international organizations such as the UN, World Bank, as well as OECD
- Books and conference proceedings related to digital governance
- Reliable online databases along with institutional websites

Data Collection Method

Relevant literature was reviewed using keywords such as digital governance, digital infrastructure, cyber security, as well as ICT in administration. Sources were selected based on credibility as well as relevance.

Data Analysis : The analysis reveals several important patterns in digital governance.

1. Expansion of Digital Infrastructure

Governments are investing in broadband networks, cloud-based platforms, as well as integrated service portals. These systems allow online applications, digital payments, as well as electronic documentation. As a result, administrative delays are reduced along with processing time.

2. Transparency and Accountability

Digital platforms enable citizens to track service status as well as government schemes. Open data initiatives, along with grievance redressal systems, strengthen accountability and reduce corruption.

3. Citizen Participation

Mobile applications, online consultations, as well as social media channels support greater public engagement. These tools encourage feedback as well as inclusive decision-making.

4. Administrative Efficiency

The use of big data analytics as well as artificial intelligence improves evidence-based planning. Governments can allocate resources efficiently along with predicting future challenges.

5. Continuing Challenges

Despite progress, issues such as unequal access, cyber threats, data privacy risks, as well as limited digital skills remain significant. Resistance to institutional change, along with infrastructure gaps, also affects smooth implementation.

Overall, digital transformation improves governance performance as well as service quality. However, its effectiveness depends on secure systems, inclusive access, as well as strong policy frameworks.

Findings of the Study

1. Digital platforms reduce paperwork as well as bureaucratic delays, leading to faster service delivery.
2. Online records and tracking systems enhance transparency as well as public trust.
3. Mobile applications and grievance systems encourage participation as well as feedback.
4. Data analytics and artificial intelligence support efficient planning as well as resource allocation.
5. Limited internet access along with low digital literacy restricts inclusive benefits.
6. Increased digitalization exposes systems to cyber risks as well as privacy concerns.
7. Successful implementation requires skilled personnel, supportive policies, as well as infrastructure investment.

The findings show that digital transformation strengthens governance effectiveness as well as accountability, but challenges must be managed carefully.

Conclusion

Digital transformation is reshaping governance by improving efficiency, transparency, as well as responsiveness. The integration of technologies such as cloud computing, artificial intelligence, as well as data analytics has modernized public administration. Digital platforms provide faster services along with better communication between governments and citizens.

At the same time, challenges such as the digital divide, cyber security risks, as well as privacy concerns require serious attention. Without proper safeguards and infrastructure, digital initiatives may create inequality as well as security threats.

Therefore, successful digital governance requires a balanced strategy that combines technological innovation with inclusive policies. Governments must invest in secure infrastructure as well as skill development, along with ethical data management practices. When technology is aligned with transparency and inclusivity, it can support sustainable as well as citizen-focused governance in the digital era.

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Impact of Rise in Securities Transaction Tax (STT) After Budget 2026**Dr. Rajeshkumar P. Chetiwal**Head and Asso. Professor,
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(MH)Email: rajesh.chetiwal@gmail.com**Abstract:**

The Securities Transaction Tax (STT) has been a key instrument in India's financial regulatory framework, aimed at ensuring tax compliance and generating stable revenue from capital market activities. The Union Budget 2026 proposed an increase in STT across select market segments, triggering renewed debate on its implications for investors and market efficiency. This study examines the impact of the rise in STT on different categories of investors, retail investors, institutional participants, and high-frequency traders. It analyses how higher transaction costs influence trading behaviour, investment horizons, market liquidity, and overall investor sentiment. The paper also explores the potential long-term effects on capital market participation and competitiveness, particularly in comparison with alternative investment avenues. The findings suggest that while the increase in STT may enhance government revenue in the short term, it could discourage frequent trading, reduce market liquidity, and disproportionately affect small and active investors. The study concludes by emphasizing the need for a balanced tax structure that supports fiscal objectives without undermining investor confidence and market development.

keywords: Securities Transaction Tax (STT), Union Budget 2026, Capital Markets, Investor Behaviour, Transaction Costs, Market Liquidity, Retail Investors, Trading Volume, Investor Sentiment.

Introduction:

Taxation of securities transactions plays a crucial role in shaping investor behaviour and market efficiency. In India, the Securities Transaction Tax (STT) has been a key policy instrument since its introduction in 2004, contributing to revenue generation and tax compliance. However, its impact on trading activity and market liquidity has remained contentious. The increase in STT proposed in the Union Budget 2026 represents a significant rise in transaction costs for market participants. Higher transaction costs can discourage frequent trading, reduce market liquidity, and influence investment decisions, particularly among retail and short-term investors. The burden of increased STT is not evenly distributed, raising concerns about market inclusiveness and fairness. Additionally, higher transaction taxes may reduce the attractiveness of domestic capital markets relative to alternative investment avenues. This study analyses the impact of the post-Budget 2026 increase in Securities Transaction Tax on investors, focusing on its implications for trading behaviour, market participation, and capital market efficiency.

What is Securities Transaction Tax (STT)?

Securities Transaction Tax (STT) is a **direct tax levied by the Government of India on the purchase and sale of securities** traded on recognized stock exchanges in India. It applies to transactions involving **equity shares, equity-oriented mutual funds, derivatives, and certain other securities**. STT was introduced in **2004** with the objective of ensuring **easy tax collection, reducing tax evasion**, and providing a **stable source of government revenue** from capital market activities. STT is payable by **both buyers and sellers**, depending on the nature of the transaction. For example, in equity delivery-based transactions, STT is charged on both purchase and sale, while in non-delivery trades and derivatives, it is generally levied only on the selling side. Since STT is charged on every eligible transaction regardless of profit or loss, it increases the **overall cost of trading** and directly affects investor returns.

Key STT Rate Changes (Effective from 1 April 2026):

According to the Union Budget 2026 proposals, the government revised the STT rates **mainly for derivatives (Futures & Options)**, equity and cash market STT rates remain **unchanged**. Here's a clear summary of **what changed in Securities Transaction Tax (STT) rates after the Union Budget 2026**:

Security / Transaction	STT Before Budget 2026	STT After Budget 2026	Change
Futures (sell side)	0.02 %	0.05 %	↑ 150 %
Options (sell – premium)	0.10 %	0.15 %	↑ 50 %
Options (exercise / intrinsic)	0.125 %	0.15 %	↑ 20 %
Equity delivery	0.10 %	0.10 %	Unchanged
Equity intraday (sell)	0.025 %	0.025 %	Unchanged

(Source: Budget 2026)

What Has Changed?**1. Derivatives STT Increased:**

- STT on **futures transactions** rose significantly from **0.02 % to 0.05 %**.
- STT on **options (both premium and on exercise)** was increased to **0.15 %** (from **0.10 % / 0.125 %** previously).

2. Cash Equity STT Unaffected:

- STT on equity delivery trades and intraday equity remains the same as before the budget.

3. Timing:

- These changes are scheduled to take effect from **1 April 2026** for transactions executed on or after that date.

Why These Changes Matter:

- The government's focus was on **curbing speculative and high-frequency trading in derivatives by making such trades costlier** rather than altering taxes on long-term equity investors.
- The STT increase is seen to have **broad implications for trading costs, market liquidity, and investor behaviour**, especially for active F&O traders and derivatives-based strategies like arbitrage funds.

Impact of Rise in Securities Transaction Tax (STT):

The **impact of the rise in Securities Transaction Tax (STT) on retail investors, institutional participants, and high-frequency traders** especially in the context of the post-Budget 2026:

A) Impact of Rising STT on Retail Investors:**1. Increased Cost of Trading:**

An increase in STT raises the **transaction cost per trade** for retail investors. Retail traders, who typically engage in frequent buy-sell activity to capitalize on short-term market movements, will see a **higher proportion of returns eaten up by taxes**. This directly reduces net profitability, particularly for **active traders** and intraday participants.

2. Reduced Trading frequency:

Higher transaction costs discourage frequent trading among retail participants, especially those with **limited capital**. Retail investors may:

- Trade less often,
- Hold positions longer to amortize tax costs, or
- Shift to **passive investment styles** (e.g., mutual funds or ETFs).

This behaviour change alters market participation patterns at the individual investor level.

3. Lower Returns on Small Portfolios:

Retail investors often operate with **smaller portfolios** compared to institutional traders. Since STT is a **proportional tax on transaction value**, even a modest rise can have a **significant impact on overall returns** for these investors, eroding gains that might already be marginal.

4. Deterrent to short term and speculative trading

Retail traders relying on short-term strategies such as scalping or quick swing trades become less profitable as STT rises. This can lead to:

- Exit from short-term strategies,
- Preference for longer holding periods, or
- Reduced market participation.

5. Behavioural shift towards long term investing:

To minimize the impact of higher STT, many retail investors may adopt longer investment horizons. This aligns with broader capital market goals (less speculation, more stable markets), but:

- May reduce market dynamism,
- Could limit opportunities for retail traders who prefer active strategies.

6. Impact on Derivatives Trading:

Since the 2026 Budget raised STT particularly on **derivatives (futures & options)**, retail traders using derivatives for hedging or speculation face:

- Higher cost of entering and exiting positions
- Reduced attractiveness of derivatives for small investors
- Possible migration to cash market strategies or risk-averse products

Retail investors may therefore reduce exposure to hedging and advanced trading strategies.

7. Influence on market participation:

For new and small retail investors, increased trading costs can act as a disincentive to enter the stock market. Higher costs may:

- Reduce the appeal of equity markets,
- Limit participation to buy-and-hold strategies,
- Channel savings toward non-market instruments like fixed deposits or insurance.

B) Impact of Rising STT on Institutional Participants:

Impact of rising Securities Transaction Tax (STT) on institutional participants (such as mutual funds, pension funds, insurance companies, hedge funds, and foreign institutional investors):

1. Higher cost of trading large volumes:

Institutional participants execute **high-value and high-frequency trades**, especially in liquid markets. An increase in STT directly raises **overall transaction costs**, which can materially affect portfolio turnover expenses. Though institutions generally have better cost absorption capacity than retail investors, **cumulative STT on large volumes can reduce risk-adjusted returns** — particularly for strategies with frequent rebalancing.

2. Impact on High-Frequency and Algorithmic Trading:

Some institutional strategies rely on algorithmic execution and short-term trading signals to capture market inefficiencies. Higher STT increases the cost per transaction, diminishing the profitability of such strategies. As a result:

- Quant funds may adjust algorithms to trade less frequently.
- Certain arbitrage opportunities might no longer be economically viable after STT costs.

3. Increased Cost of Hedging:

Institutions often use derivatives — particularly futures and options — to hedge portfolio risk. Because the Budget 2026 STT rise was concentrated on the derivatives segment:

- Hedging costs have increased, especially for futures and option positions.

- Funds that use dynamic hedging (e.g., mutual funds, pension funds) may incur higher expenses, influencing risk management choices.

This may lead to a recalibration of hedging frequency or a switch to alternative risk mitigation instruments.

4. Competitive Positioning vs. Offshore Markets:

Institutional players have global investment mandates and can compare trading costs across markets.

A relatively high STT in India may:

- Reduce the relative competitiveness of Indian exchanges,
- Encourage some institutions to shift certain trading or hedging activity to overseas exchanges or cross-listed instruments,
- Redistribute capital flows toward jurisdictions with lower transaction costs.

5. Differential Impact Based on Investor Type:

a) Mutual Funds & Insurance Funds

- Cost increases may be passed on indirectly to investors through marginally lower returns.
- Asset managers may adopt longer holding periods to reduce turnover costs.

b) Hedge Funds & Proprietary Trading Firms

- Strategies heavily dependent on turnover and derivatives may see profitability compression.
- Some models may become less attractive if STT outweighs expected gains.

c) Foreign Institutional Investors (FIIs/FPIs)

- FIIs consider transaction efficiency and cost competitiveness when allocating across markets.
- Higher STT may weigh on India's relative appeal compared to other emerging markets.

6. Strategic Adjustments by Institutions:

Institutional players are likely to adopt various strategic responses, including:

- Condensed trade execution windows to reduce incidental turnover,
- Netting of trades where feasible to lower taxable transactions,
- Use of ETFs or indexed products to reduce direct transaction exposure,
- Negotiated brokerage or execution strategies that optimize post-tax returns.

C) Impact of Rising STT on High-Frequency Traders:

The *impact of rising Securities Transaction Tax (STT)* on **High-Frequency Traders (HFTs)** — the ultra-fast automated traders who execute large numbers of trades in milliseconds. HFTs typically place and cancel thousands of orders per day, profiting from tiny price differences across trades. Because STT applies per executed transaction (often on both buy and sell), rising STT can materially affect profit margins.

1. Pressure on Turnover-Based Business Models:

Many HFT firms operate on *high turnover, low margins*. A higher STT:

- Reduces net returns even if gross profitability stays same
- Reduces incentive to execute ultra-frequent trades
- May make HFT less competitive compared to market makers in lower-tax jurisdictions

This can lead to **reduced trading activity** by HFTs on that exchange.

2. Possible Reduction in Market Liquidity:

HFTs are often **major liquidity providers** — posting buy and sell quotes and narrowing bid-ask spreads. Higher STT can:

- Lower HFT quoting activity
- Widen bid-ask spreads
- Reduce liquidity (especially in less-traded securities)

Liquidity impact: Less depth + wider spreads → higher costs for all market participants

3. Reduction in Market Efficiency:

HFTs help enforce *price continuity* across markets and time. With reduced HFT participation:

- Prices may adjust more slowly

- Arbitrage opportunities persist longer
- Market efficiency could decline

While not all HFT activity is beneficial, some contributes to tighter markets.

4. Strategic Rebalancing & Technology Investment:

HFT firms may respond by:

- Investing in faster infrastructure to capture bigger, less frequent opportunities
- Using smarter algorithms to minimize executed trades
- Reassessing risk models to filter out lowest-margin trades

This can shift market microstructure.

Key Takeaways:

- The rise in STT after the Budget raises per-trade costs, impacting traders more than long-term investors.
- Long-term and SIP investors remain largely unaffected due to low trading frequency
- Intraday and F&O traders feel the maximum impact because higher STT directly cuts into thin margins.
- Reducing overtrading and adopting longer holding periods can help offset higher STT costs.
- Shifting part of the portfolio to fixed-income and debt instruments lowers exposure to equity transaction taxes.

Conclusion:

The rise in STT following Budget 2026 significantly impacts retail investors by **raising costs, altering trading behaviour, and reducing the appeal of active trading strategies**. While a shift toward long-term investment may enhance market stability, the increased burden on retail participants — especially frequent traders — may discourage participation and reduce overall market vibrancy.

The rise in STT affects institutional participants by increasing transaction costs, altering trading and hedging strategies, and potentially reducing market participation in high-turnover segments. While large institutions can better absorb these costs than retail investors, the cumulative effect on strategy design, portfolio turnover, and market competitiveness is non-trivial. The net outcome may be a shift toward **lower-turnover, long-term investment strategies** and a re-evaluation of cost-efficient execution practices.

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Role of AI Technology in Banking Sector**Dr.Ms.Sulakshana V. Chavan***Assistant Professor**V. P. Institute of Management Studies & Research, Sangli, Maharashtra, India*svchavanvp@gmail.com**Abstract:**

Artificial intelligence (AI) is an increasingly important technology in the banking sector. It is being used to power both internal operations and customer-facing applications. To stay ahead of fintech trends, increase their competitive advantage and provide valuable services and better customer experiences, banks and other financial services firms have embraced digital transformation initiatives. As a result, banks are improving a wide range of functions across the front, middle and back office—including customer service, fraud detection, wealth management and regulatory compliance. By integrating AI technologies, banks are setting new benchmarks for operational efficiency, client engagement and sustainable growth. This comprehensive approach to innovation sees AI advancements integrated thoughtfully across all banking operations, thereby forging a sector that is more resilient, agile and centered around the needs and expectations of its clients.

Keywords: Artificial Intelligence, Banking, Chatbots, Cyber security

1. The role of AI in banking

The banking sector, in particular, is increasingly relying on the advantages of AI technologies to remain competitive. Customers want seamless digital banking experiences: apps that anticipate their needs and the ability to interact with people or virtual assistants depending on the complexity of their issue. Companies need to improve the user experience to keep those customers happy. Adopting and deploying generative AI solutions, coupled with effective data management, is a key step toward that goal.

While AI is powerful on its own, combining it with automation unlocks even more potential. AI-powered automation combines the intelligence of AI with the reliability of automation. Traditional tools like Robotic Process Automation (RPA) have been valuable for streamlining repetitive tasks, but banks are now beginning to adopt agentic AI systems to handle more complex workflows.

An AI agent is capable of autonomous decision-making and, for example, can guide a loan application from start to finish. It can interact with the customer, verify documents, check creditworthiness against internal and external databases and flag compliance issues. It adapts to changing information and makes decisions in real time instead of just following preset rules, all with minimal human intervention.

Bankers have long used natural language processing (NLP) to parse the vast amounts of data they have internally or that they pull from third-party sources. They use data analytics tools to uncover insights and trends and make more informed decisions around key investments and wealth management.

Banking institutions are under increased pressure for digital transformation. Customers demand automated experiences with self-service capabilities, but they also want interactions to feel personalized and uniquely human.

Banks continue to prioritize AI investment to stay ahead of the competition and offer customers increasingly sophisticated tools to manage their money and investments. Customers continue to prioritize banks that can offer personalized AI applications that help them gain visibility on their financial opportunities.

2. Benefits of AI in banking : There are several key benefits for banks that embrace and deploy AI.

- **Enhanced APIs:** Banking operations increasingly depend on the use of application programming interfaces (APIs) to enable customers to track their money on various applications. For example, banks must give API permission to third-party budgeting apps so customers can monitor multiple

bank accounts. AI enhances API usage by enabling more security measures and automating repetitive tasks, making them more powerful.

- **More intelligent customer tools:** The rise of generative AI and agentic AI powered by deep learning means that the investment and banking industries can deploy more sophisticated tools to streamline customer service. AI-powered chatbots and virtual assistants can enhance customer support, helping customers solve small problems on their own. AI can also power budgeting apps that help customers better manage their finances and save more money.
- **New markets and opportunities:** AI-driven predictive analytics and forecasting tools can identify new areas of growth, improve underwriting processes and better estimate which customers are a churn risk. For example, banks can analyze their customers' habits, such as how often they log in or deposit money and compare it to other data points to determine whether individual customers can be on the verge of canceling their accounts.
- **Improved Risk Management:** AI algorithms can analyze vast amounts of data to identify patterns and assess creditworthiness more accurately. This can lead to fewer loan defaults, reduced risk provisions, and improved profit margins. According to EY, AI can improve risk management leading to substantial cost savings through improved fraud detection and creditworthiness assessments.
- **Enhanced Revenue Generation:** AI-powered tools can personalize financial products and services for individual customers, leading to increased customer satisfaction and loyalty. Additionally, AI can identify new business opportunities and optimize marketing campaigns, potentially boosting revenue streams. For example, Bank of America uses AI to recommend personalized investment strategies, potentially increasing customer engagement and product adoption.

3. Challenges

By integrating AI technologies, banks are setting new benchmarks for operational efficiency, client engagement and sustainable growth. This comprehensive approach to innovation sees AI advancements integrated thoughtfully across all banking operations, thereby forging a sector that is more resilient, agile and centered around the needs and expectations of its clients. The Internet is generally perceived as not secure enough for transmitting sensitive data such as payments. Upon a closer look, however, this view is not warranted, since technologies such as public key encryption and firewalls address essential security concerns. Moreover, such technologies are already available. The only remaining barrier is the lack of real world users of those technologies. In response to these comprehensive sector-wide changes, banks are strategically reallocating their IT budgets toward fostering innovations that can effectively counter the competitive threats posed by tech giants and emerging business models, such as embedded finance, which blends financial services with nonfinancial platforms. This strategic realignment encompasses not just consumer-centric services but also aims to bolster risk management frameworks, optimize compliance procedures, and drive innovation in product development and financial advisory offerings.

4. Conclusion

Information system is a system which helps management to take effective decisions for an organization. It is a tool which collect, process, store and distribute information to the management. Information systems are useful for providing information rather than raw data to the management. Data only shows number whereas information provides logical understanding of a figure. Information systems basically consist of data related to people, process and procedures inside the organization as well as it provides information of external business environment affecting the business.

The future of AI in banking will likely include institutions advertising their use of AI and how they can deploy advancements faster than competitors. AI will help banks transition to new operating models, streamline workflows, embrace digitization and smart automation and achieve continued profitability in a new era of commercial and retail banking.

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Startups and Entrepreneurship Developments in Viksit Bharat: Drivers, Challenges, and the Road to 2047

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Abstract

India's ambitious vision of becoming a developed nation by 2047—Viksit Bharat—positions entrepreneurship and startups as central pillars of economic transformation. This research paper examines the current state of India's startup ecosystem within the Viksit Bharat framework, analysing key drivers including policy reforms, technological innovation, regional expansion beyond metropolitan hubs, and inclusive entrepreneurship models. Drawing on recent government initiatives, incubation success stories, and expert perspectives, the paper identifies critical challenges in deep-tech funding, women's participation, and skill-development alignment. It concludes with strategic recommendations for accelerating entrepreneurial growth as a vehicle for sustainable and inclusive national development.

Keywords: Viksit Bharat, startups, entrepreneurship, innovation ecosystem, deep-tech, inclusive growth, Atmanirbhar Bharat

1. Introduction

As India approaches the centenary of its independence in 2047, the vision of Viksit Bharat—a developed, self-reliant, and globally influential nation—has emerged as a unifying national aspiration. This vision transcends conventional metrics of economic growth, encompassing technological sovereignty, social inclusion, and sustainable development. Within this transformative framework, entrepreneurship and startups have been identified not merely as contributors to economic activity but as fundamental drivers of national transformation.

Prime Minister Narendra Modi, addressing the Viksit Bharat Young Leaders Dialogue in January 2026, articulated this paradigm shift: "Your capability, your talent—I have always drawn energy from your energy. Today, all of you are holding the reins of the goal of a Developed India". This statement reflects a broader recognition that India's demographic dividend, with 65 per cent of the population under 35, must be channeled through entrepreneurial energy to realise the 2047 vision.

This paper examines the multifaceted developments in India's startup ecosystem within the Viksit Bharat context, analysing policy frameworks, regional expansion, sectoral trends, inclusion strategies, and persistent challenges. It draws upon recent government data, incubation centre achievements, and expert insights to provide a comprehensive assessment of how entrepreneurship is being engineered as a vehicle for national development.

2. The Startup Ecosystem: Scale and Trajectory

India's startup ecosystem has undergone a remarkable transformation over the past decade. From fewer than 500 registered startups before 2014, the country now boasts over 1.59 lakh startups recognised by the Department for Promotion of Industry and Internal Trade (DPIIT), establishing India as the world's third-largest startup ecosystem. This growth trajectory has been accompanied by the emergence of more than 100 unicorns, signalling the maturity and global competitiveness of Indian entrepreneurship.

The employment impact of this ecosystem has been substantial. Over the past eight years, recognised startups have created more than 16.6 lakh direct jobs, with projections suggesting the potential for 50 million new employment opportunities by 2047. The "Unicorn 2.0: Adding the Next Trillion" report by CII and McKinsey positions startups as one of three foundational pillars of Viksit Bharat, alongside skillsets and sustainability—a clear indication that entrepreneurship is now viewed as integral to national development architecture.

What distinguishes the current phase of India's startup evolution is its geographical democratisation. Entrepreneurship is no longer restricted to metropolitan startup hubs but is taking root in smaller towns and rural areas, stimulating local economies and introducing innovative solutions tailored to diverse regional contexts. This decentralisation aligns with the Viksit Bharat imperative of inclusive development that reaches beyond urban centres.

3. Policy Architecture Enabling Entrepreneurial Growth

3.1 Foundational Reforms

The government's proactive role in creating an enabling environment for startups has been instrumental in ecosystem growth. Initiatives such as Startup India, Digital India, and Make in India have established a comprehensive support architecture encompassing funding support, regulatory ease, mentorship networks, and digitisation. The shift from what Prime Minister Modi characterised as the "policy paralysis and red tape that existed before 2014" to a facilitative governance model has been pivotal.

Key structural reforms include the Seed Fund Scheme, Credit Guarantee Scheme, and India SME 4.0 Competence Centres, which have systematically lowered barriers that historically constrained entrepreneurial aspirations. The transition from complex regulatory processes to single-window clearances and digital-first policy execution has transformed starting a business from a privilege into an accessible option for a broader demographic.

3.2 Deep-Tech and Strategic Sector Focus

Recognising that technological sovereignty is essential for developed nation status, policy attention has increasingly focused on deep-tech and strategic sectors. The opening of the space sector to private participation has catalysed the emergence of over 300 space startups, with companies like Skyroot Aerospace and Agnikul Cosmos demonstrating India's growing capabilities in advanced technologies. Similarly, reforms in the drone and defence sectors, including simplified regulations and enhanced private participation, have enabled youth-led innovation, resulting in over 1,000 defence startups operating across the country.

The National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) has established Technology Business Incubators (TBIs) at leading institutions, creating dedicated pathways for deep-tech entrepreneurship. DRISHTI CPS at IIT Indore, for instance, incubated 59 deep-tech startups in a single year, with total funding support of approximately ₹90 million and a remarkable 14x follow-on investment leverage from its catalytic support for graduated startups.

3.3 Infrastructure and Industrial Corridors

The National Industrial Corridor Development Programme (NICDP) represents a significant interface between entrepreneurship and industrial infrastructure. Recent investor roundtables in Bengaluru have showcased the potential of southern industrial nodes—Tumakuru, Krishnapatnam, Koppa, Orvakal, Palakkad, and Zaheerabad—as platforms for advanced manufacturing and innovation. These greenfield industrial cities, designed with advanced infrastructure and digital governance, are positioned to host startups and MSMEs in sectors ranging from electronics and automobiles to clean-tech and food processing.

3.4 Skill Development Integration

The recently launched PM-SETU programme represents a bold integration of skills, technology, and enterprise. Upgrading 1,000 Industrial Training Institutes (ITIs) through a ₹60,000 crore hub-and-spoke model, the initiative establishes incubation units and innovation centres within traditional skill-training institutions. This architecture bridges the longstanding gap between "training for jobs" and "training for enterprise," creating pathways for self-employment readiness alongside employability skills.

The Viksit Bharat Initiative for Student Innovation and Outreach Network (VISION) portal, launched in November 2024, further democratises access to mentorship and training, specifically targeting underprivileged children and students in remote areas. Science and Technology Minister Dr. Jitendra Singh emphasised that such initiatives are integral to realising Vision India 2047's aspiration of positioning India as a global leader in technology, education, and economic growth.

4. Regional Expansion: Beyond Metropolitan Hubs

4.1 The Rise of Tier-2 and Tier-3 Cities

A defining characteristic of India's evolving startup landscape is the emergence of entrepreneurial activity beyond traditional metropolitan centres. Platforms such as KodNest, which train engineers in real-world skills, have demonstrated that students from non-metro regions can secure positions at leading companies like PayPal and Swiggy without the conventional IIT label. The story of a KodNest alumna receiving a ₹34.4 lakh package from PayPal exemplifies how performance-focused training ecosystems can offer high returns without high entry barriers.

This phenomenon reflects a deeper transformation: entrepreneurship is becoming aspirational in Tier-2 and Tier-3 cities, where startups are solving India-specific problems at scale and speed. Amit Jain, founder of CarDekho, notes that what excites him most is not unicorns or big tech stories but "the rise of ideas from tier 2 towns, tribal districts, college dorm rooms, and even home kitchens". This is the Bharat where "grit often matters more than capital, and where technology is becoming the great equaliser".

4.2 Central India's Deep-Tech Emergence

The DRISHTI CPS initiative at IIT Indore exemplifies how institutional presence in non-metropolitan locations can catalyse regional entrepreneurial ecosystems. Despite being away from metro cities, which presented challenges in creating opportunities, DRISHTI CPS has established a robust Technology Business Incubator that supports deep-tech entrepreneurs with business and technical mentorship from national and international experts, along with access to prototyping and testing facilities.

With over 25 per cent of its incubated startups having origins or operations in Madhya Pradesh, DRISHTI CPS demonstrates the significant influence that well-designed incubation support can exert in shaping startup ecosystems in central India. Its collaboration with entities such as the Chandigarh Angel Network, Green Trunk Ventures, and YourNest VC, combined with strategic alliances with industry stalwarts including Aditya Birla, Mahindra & Mahindra, and Cummins, creates a comprehensive support architecture that transcends geographical limitations.

4.3 Direct-to-Consumer (D2C) and the New Bharat

The rise of Direct-to-Consumer (D2C) brands represents another dimension of regional expansion. D2C models have democratised access to quality, affordable products while building direct relationships with consumers across geographical boundaries. This model gives startups the agility to scale, experiment, and create meaningful connections, especially in an increasingly digital Bharat. By fostering local manufacturing, supply chain innovation, and brand-building, D2C entrepreneurship aligns with the vision of Atmanirbhar Bharat—a self-reliant India making products not only domestically but for the world.

5. Inclusion as an Entrepreneurial Imperative

5.1 Women's Entrepreneurship and Engineering Participation

If Viksit Bharat is to be more than a slogan, inclusion must form its foundation. Women's participation in engineering and entrepreneurship remains simultaneously a challenge and an opportunity. Women currently account for just 12–15 per cent of the engineering workforce, with representation in core branches remaining particularly limited. This gender gap constrains both the talent pool for technology entrepreneurship and the diversity of innovations addressing varied societal needs.

However, encouraging trends are emerging. Platforms like KodNest have reported growing female participation, especially from conservative regions, driven by supportive, mentorship-led environments. The example of women in tribal areas using solar-powered tools designed by rural engineers, or self-help groups supported by local polytechnics building blockchain-based supply chains, represents not future fantasies but initiatives already taking shape under programmes such as Unnat Bharat Abhiyan and the National Rural Livelihood Mission.

5.2 Micro-Entrepreneurship and Grassroots Innovation

The PM-SETU programme's design includes provisions for incubation within ITIs, but experts suggest that greater emphasis on micro-entrepreneurship could enhance rural inclusion. As one analysis notes,

"Inclusivity starts when even the smallest innovator can thrive"—suggesting the need for light micro-incubation tracks, seed and challenge grants for early-stage livelihood ideas, and stronger Self-Help Group (SHG) and cooperative linkages. Such community networks represent the real scaling infrastructure for India's rural enterprise.

5.3 Youth Engagement and Leadership

The Viksit Bharat Young Leaders Dialogue 2026 witnessed unprecedented youth participation, with more than five million young people registering for the platform and over three million participating in the Viksit Bharat Challenge. This level of engagement reflects what Prime Minister Modi described as the strong resolve of India's "Amrit Peedhi" (youth generation) to shape the country's future.

The Orange Economy—driven by culture, content, and creativity—has emerged as a significant domain for youth entrepreneurship. Sectors such as media, film, gaming, music, digital content, and immersive technologies like VR and XR are creating new global opportunities for Indian creators, with platforms like the World Audio-Visual and Entertainment Summit (WAVES) helping young talent reach international audiences.

6. Deep-Tech Entrepreneurship: Opportunities and Challenges

6.1 The Funding Paradox

India's deep-tech sector faces a persistent funding paradox. While strategic imperatives have led the government to step up with funds and support for startups in sensitive areas, the high uncertainty and long gestation periods associated with deep-tech ventures have deterred private investors. This gap is critical because private capital and expertise are indispensable for the journey from concept to commercial product.

Yogesh Pandit, Director of Product Acceleration at the Foundation for Science, Innovation and Development (FSID) at the Indian Institute of Science (IISc), articulates the challenge: "Private investment in India also needs to mature. In the West, institutions like MIT and Stanford are heavily funded by the industry, creating a symbiotic model: academia receives resources, and industry gains access to cutting-edge research. That maturity is still developing here".

6.2 The Gate-Based Funding Model

Pandit advocates a gate-based approach to deep-tech funding as a solution to the funding paradox. Instead of seeking large sums upfront, startups should adopt a structured new product development framework: "Don't ask for ₹100 crore at once, ask for ₹3 crore to hit the next milestone. When you achieve it and your confidence rises from 30% to 70%, you then raise the next tranche". This approach enables "failing fast, failing cheap" while building investor confidence through demonstrated progress.

6.3 R&D Infrastructure and Ecosystem Gaps

India's low R&D investment—just 0.7 per cent of GDP, with nearly 70 per cent coming from government—leaves limited private-sector capability to support deep-tech product development. FSID's Pravridhi initiative addresses this gap by creating a full-stack ecosystem for deep-tech startups, covering market research, IP and regulatory management, product and programme management, core R&D capacity, and complete product life-cycle planning.

The distinction between incubators and accelerators becomes particularly relevant in deep-tech contexts. Incubators help startups grow organically, refining ideas and building foundational capabilities, while accelerators provide structured, time-bound programmes designed to rapidly push products toward market readiness, typically within two to three years. Both models are essential for a comprehensive deep-tech ecosystem.

6.4 Hardware vs. Software Entrepreneurship

Building hardware startups presents fundamentally different challenges compared to software ventures. India's stalled momentum in semiconductor manufacturing—having manufactured chips at 120–130 microns in the 1980s but failing to sustain progress—means the country now operates in catch-up mode. Current PLI schemes therefore emphasise packaging and older-generation nodes used in automotive and non-critical applications, recognising that moving to the 1–5 nm frontier in chip design will take time.

This reality underscores the importance of patient capital and long-term strategic vision in deep-tech entrepreneurship. As Pandit notes, "When you are catching up, you don't start with cutting-edge development, you start with manufacturing. You import technology, build production capability, get the engine running, and only then transition toward advanced design" .

7. Challenges and Barriers

7.1 The Employability Gap

India produces more than 1.5 million engineering graduates annually, yet many remain underemployed . This gap highlights the need to view engineering not merely as a qualification but as a mindset where problem-solving, innovation, and entrepreneurship intersect. New training models combining hands-on learning with access to national and international coding competitions and hackathons are responding to this challenge, but the scale of the problem requires systemic educational reform .

7.2 Persistent Gender Disparity

Despite encouraging trends, women's representation in the engineering workforce at 12–15 per cent remains a significant constraint on inclusive entrepreneurship . Addressing this disparity requires greater visibility of women role models, enhanced financial literacy programmes targeting women, and improved access to digital tools. Engineering colleges can play a transformative role by acting as incubators while women-led microenterprises grow into strong local economies .

7.3 Deep-Tech Investment Maturity

The immaturity of private investment in deep-tech sectors represents a structural constraint on India's technological ambitions. Beyond funding quantum, the investment community needs deeper education about deep technology to evaluate risk and back long-term product development meaningfully . Without this understanding, even well-designed government programmes may struggle to catalyse sustainable deep-tech ecosystems.

7.4 Rural Entrepreneurship Support

While initiatives like PM-SETU represent significant steps toward integrating skill development with entrepreneurship, ensuring that rural youth and women are not left behind requires deliberate design choices. Experts recommend greater local flexibility for ITIs to customise programmes based on local needs and resources, as well as stronger linkages with Self-Help Groups and cooperatives that provide the financial and social capital necessary for sustainable rural enterprise .

8. Future Outlook and Recommendations

8.1 Vision 2047: Scaling Impact

As India progresses toward 2047, the role of entrepreneurs must evolve from scaling businesses to scaling impact. This requires aligning personal ambition with national purpose—acting not as bosses but as builders . The "Unicorn 2.0" framework positioning startups alongside skillsets and sustainability as foundational pillars provides a useful template for integrating entrepreneurial growth with broader development objectives

8.2 Strengthening the Innovation Continuum

Creating a seamless continuum from idea to impact requires strengthening multiple interfaces:

Academia-Industry-Startup Linkages: Following the model of FSID's Pravridhi, which brings together critical functions for deep-tech product development, more institutions should establish structured pathways for translating research into commercial products . This includes enabling industry-faculty collaboration, helping startups recruit specialised R&D talent, and supporting complete product life-cycle planning.

Incubation-Acceleration-Investment Pipeline: DRISHTI CPS's success in acting as a feeder system, channeling well-prepared, high-potential startups toward established venture capitalists, demonstrates the

value of structured intermediation . Expanding such models across regions and sectors can ensure that promising ventures receive appropriate support at each stage of maturity.

Skill-Enterprise Integration: The PM-SETU model of establishing incubation units within ITIs should be evaluated for expansion, with particular attention to micro-entrepreneurship tracks and flexible, localised programme design .

8.3 Policy Recommendations

- Based on the analysis presented, the following policy recommendations emerge:
- First, establish Centres of Innovation and an Engineer Startup Corps to systematically nurture entrepreneurial mindsets among engineering students .
- Second, deepen gender-responsive education and entrepreneurship support, recognising women's inclusion as both a equity imperative and an economic opportunity .
- Third, accelerate private investment maturity in deep-tech through investor education programmes and co-investment mechanisms that share risk while building private sector capacity .
- Fourth, strengthen Centre-State partnerships for industrialisation and startup support, aligning state policies with national objectives while enabling local customisation .
- Fifth, expand the gate-based funding model for deep-tech ventures across government programmes, encouraging milestone-based support that enables "failing fast, failing cheap" while building toward commercial viability .

8.4 The Cultural Dimension

Beyond policies and programmes, realising the entrepreneurial vision of Viksit Bharat requires cultural transformation. Prime Minister Modi's call to move away from what he described as the "colonial-era mindset that undervalues India's own heritage and capabilities" resonates in the entrepreneurial context . Quoting the ancient Vedic phrase "Aano Bhadrāḥ Kratavo Yantu Vishwatah"—let noble thoughts come from all directions—he articulated a vision of India remaining open to global ideas while staying rooted in its own civilisational strength .

This cultural confidence, combined with systematic institutional support and inclusive design, can position entrepreneurship as the vehicle through which India's demographic dividend translates into developed nation status by 2047.

9. Conclusion

The journey toward Viksit Bharat @2047 represents one of the most ambitious national transformation efforts of the twenty-first century. Within this framework, startups and entrepreneurship have emerged not merely as contributors to economic growth but as fundamental drivers of innovation, inclusion, and national resilience.

India's entrepreneurial ecosystem has achieved remarkable scale, with over 1.59 lakh recognised startups and the world's third-largest startup ecosystem. Yet numbers alone do not define transformation. The true measure of progress lies in the democratisation of entrepreneurial opportunity—the rise of founders from Tier-2 and Tier-3 cities, the growing participation of women in engineering and enterprise, the emergence of deep-tech ventures addressing national priorities, and the integration of skill development with entrepreneurial aspiration.

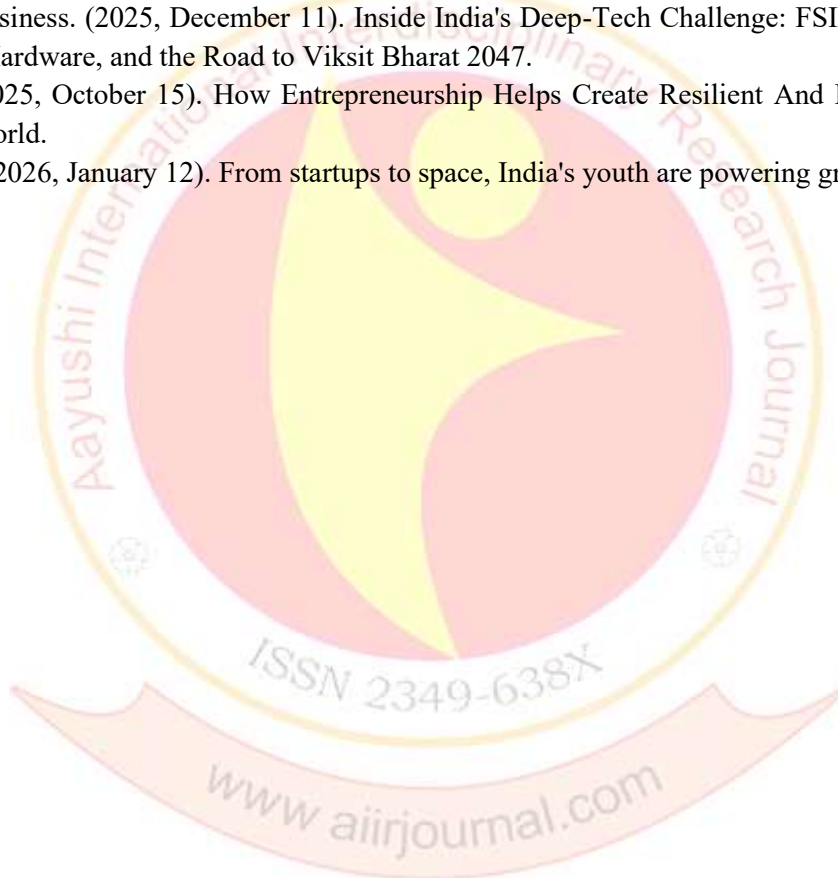
The policy architecture supporting this transformation has evolved significantly, from foundational reforms like Startup India to strategic initiatives in deep-tech sectors and infrastructure development through industrial corridors. Programmes like PM-SETU and VISION portal demonstrate increasing sophistication in linking skills, innovation, and enterprise.

However, persistent challenges remain. The employability gap among engineering graduates, gender disparity in technology fields, immaturity of private deep-tech investment, and the need for stronger rural entrepreneurship support require sustained attention and innovative solutions.

As India approaches the centenary of independence, the triad of entrepreneurship, engineering empowerment, and inclusive leadership must become embedded in the nation's cultural and economic DNA . The energy and capability of India's youth, combined with systematic institutional support and collaborative governance, can transform the Viksit Bharat vision from aspiration to reality. Let us not just imagine a developed India—let us build it, engineer it, innovate it, and include everyone in the process .

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Role of Intermediaries in Strengthening the Tourism Sector**Dr. Ashwini Tanaji Kamble**

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ashwinikamble300690@gmail.com**Abstract;**

Tour operators play a pivotal role in the tourism industry by acting as intermediaries between tourists and tourism service providers. They design, organize, promote, and manage travel packages, thereby facilitating smooth travel experiences and contributing significantly to tourism development. This paper examines the role of tour operators in destination development, economic growth, customer satisfaction, sustainability, and smart tourism adoption. The study highlights their functions, challenges, and evolving role in the digital era.

Keywords: Tour Operators, Tourism Development, Travel Intermediaries, Smart Tourism, Destination Management

1. Introduction:

Tourism is one of the fastest-growing service sectors globally and contributes significantly to employment generation, foreign exchange earnings, and regional development. Within the tourism system, tour operators act as a crucial link between tourists and tourism suppliers such as hotels, transport providers, guides, and attractions. A tour operator is an organization or individual that plans, packages, and sells tourism products either directly to tourists or through travel agents. Their role has evolved from traditional package sellers to experience designers and destination promoters, especially with the growth of digital and smart tourism.

2. Concept And Meaning Of Tour Operators:

A tour operator is a business entity that combines various tourism services transportation, accommodation, sightseeing, meals, and activities into a single travel package and sells it at a fixed price.

Types of Tour Operators:

- Inbound Tour Operators – Handle foreign tourists visiting a destination
- Outbound Tour Operators – Organize tours for residents traveling abroad
- Domestic Tour Operators – Arrange tours within the country
- Specialized Tour Operators – Focus on niche tourism (eco-tourism, adventure, heritage, medical tourism)

3. Objectives of The Study:

1. To study the concept and functions of tour operators
2. To analyze the role of tour operators in tourism development
3. To examine their contribution to economic growth and employment
4. To understand the role of tour operators in sustainable and smart tourism
5. To identify challenges faced by tour operators in the modern tourism industry

4. Tourist Destination In Southern Maharashtra:

The following are the nineteen most popular tourist destinations in Southern Maharashtra spread over Satara, Sangli and Kolhapur districts.

Table 1.1
Tourist Destination in Southern Maharashtra

SOUTHERN MAHARASHTRA			
Sr. No	District	Tourism Places	Total
1	Satara	Mahabaleshwar, Kass Plateau, Sajjangad, Thoseghar, Koyna Dam, Pratapgad, Panchgani, Sikhar-Shingnapur, Aundh.	9
2	Sangli	Chandoli National Park, Sagareshwar Wildlife Sanctuary, Ganpati Temple, Dandoba Hills	4
3	Kolhapur	Mahalaxmi Temple, Jyotiba Temple, Panhala Fort, Kanneri Math, the New Palace, Gaganbawada	6
Total			19

Sources: Researcher compile

4.1 Selection of Tour Operators:

For the selection of Tour Operators respondents, the researcher has used finite population formula given by the Taro Yamane. The population is 81 Tour operators.

Table 12

Population	81
Error	0.05%
Sample Size (Taro Yamane)	67.35
Round Figure	68

Sources: District Tour Operator Association

$$\pi = \frac{\pi}{(1+\pi e)^2}$$

$$\pi = \frac{81}{(1+81*0.05)^2}$$

$$= 68$$

By using the sample size formula, the researcher has taken 68 samples from Travel agency respondents.

4.2 Sample Size

Table 1.3
Sample Size

Sr. No	Respondents	Number of Respondents					
		District	Population Size	Proportionate Sample Size		Rounded off	Sample Size
1.	Tour Operators	Satara	26	26/81*68	21.82	22	68
		Sangli	20	20/81*68	16.79	17	
		Kolhapur	35	35/81*68	29.38	29	
Total						68	

Sources: Researcher complier

The stakeholder is a Tour Operator, firstly researcher find the population size is 68 tour operators. The researcher applied the Taro Yamane formula to the total population of 68 and got the sample size of Satara district, 26, Sangli district, 20, and Kolhapur district, 35. Then, the researcher calculated the proportionate sample size of each district: Satara district is 22, Sangli district is 17, and Kolhapur district has 19 Tour operators. The total sample size is 68 but for more accuracy researcher collected the data from 70 tour operators.

4.3. Methodology:

The present study is based on both primary and secondary sources of data collection. Primary data were collected to obtain first-hand information related to tourism in the selected study area. For this purpose, the researcher designed a structured questionnaire and interview schedule to gather relevant information from the respondents. Secondary data were collected from various published and unpublished sources such as books, journals, magazines, newspapers, articles, internet sources, M.Phil. dissertations, and Ph.D. theses related to the selected research problem. The collected data were analysed using appropriate statistical techniques with the help of tools such as MS Excel and SPSS. Suitable statistical tests were applied to test the formulated hypotheses and to draw meaningful conclusions.

5. Role of Tour Operators in Tourism:**5.1 Product Development**

Tour operators design attractive tour packages by combining transport, accommodation, sightseeing, and entertainment. They customize packages according to tourist preferences, budget, and duration.

5.2 Destination Promotion and Marketing

Tour operators promote destinations through brochures, websites, social media, and online travel platforms. Their marketing efforts help create awareness and increase tourist inflow to destinations, including lesser-known regions.

5.3 Facilitating Tourist Convenience

By handling bookings, documentation, itinerary planning, and logistics, tour operators reduce travel complexities and ensure a hassle-free travel experience for tourists.

5.4 Economic Contribution

Tour operators generate revenue, promote local businesses, and create employment opportunities for guides, drivers, hotel staff, artisans, and local communities.

5.5 Support to Local Communities

Through community-based tourism, tour operators encourage local participation, promote local culture, crafts, cuisine, and traditions, and ensure income generation at the grassroots level.

6. Role Of Tour Operators in Sustainable Tourism:

Tour operators play an important role in promoting sustainable tourism by:

- Encouraging eco-friendly practices
- Promoting responsible tourist behaviours
- Supporting local culture and heritage conservation
- Designing low-impact tourism packages

Sustainable tour operations help protect natural resources while ensuring long-term tourism growth.

7. Role Of Tour Operators In Smart Tourism:

With the rise of smart tourism, tour operators increasingly adopt digital technologies such as:

- Online booking systems
- Mobile applications
- Digital payments
- Data analytics and AI-based recommendations

These technologies improve efficiency, personalization, and customer satisfaction. Tour operators act as key stakeholders in smart tourism ecosystems by integrating technology with service delivery.

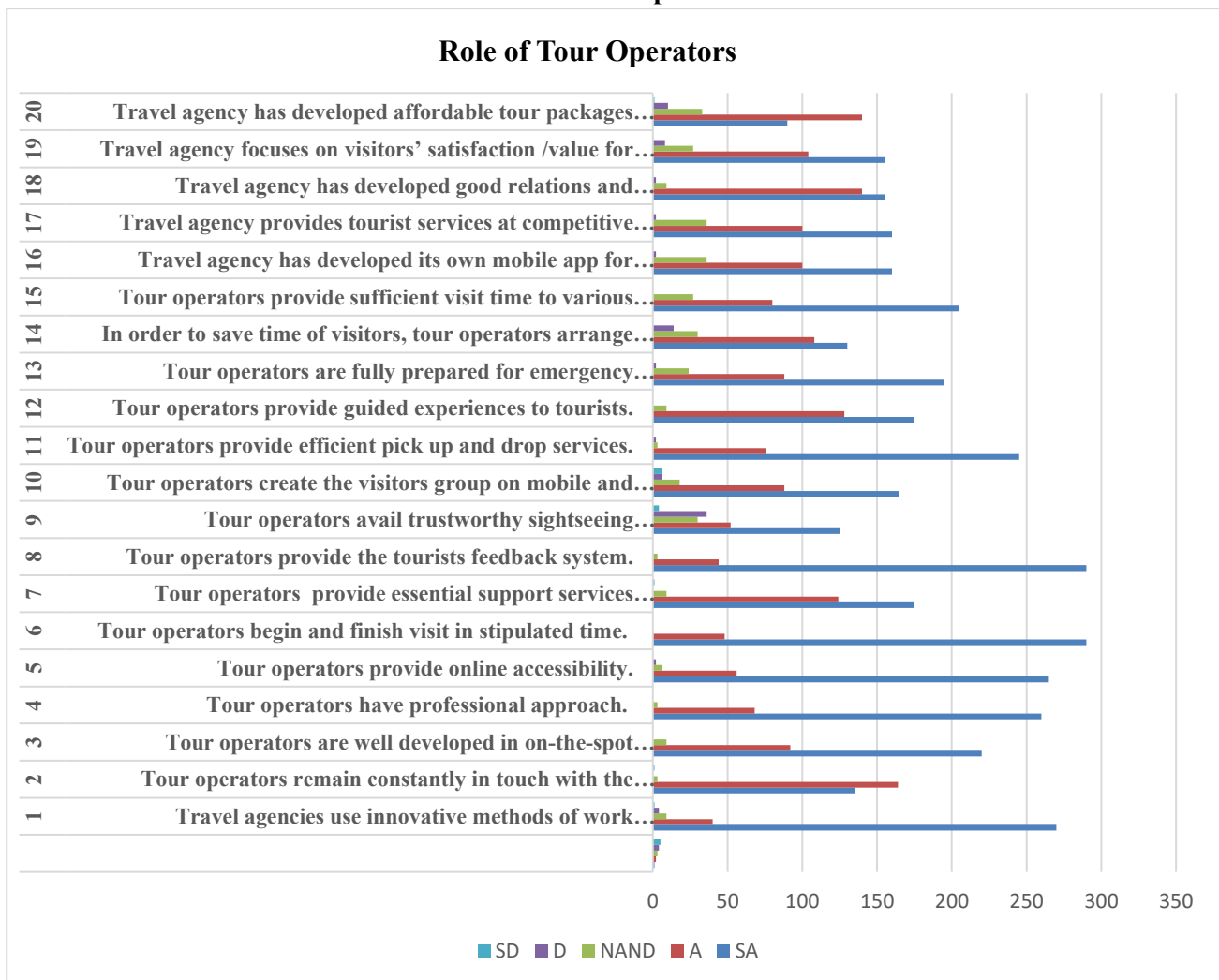
Role of Tour Operator
Table 1.4

Sr. no.	Statement	SD	D	N	A	SA	Total	% to Total	Mean
		1	2	3	4	5			
(a) Organizational Innovations									
1	Travel agencies use innovative methods of work distribution among tour operators.	1	4	9	40	270	324	93	4.6286
2	Tour operators remain constantly in touch with the tourism agents & other stakeholders.	1	0	3	164	135	303	87	4.3286
3	Tour operators are well developed in on-the-spot decision-making during tour.	1	0	9	92	220	321	92	4.5857
4	Tour operators have professional approach.	0	0	3	68	260	331	95	4.7286
5	Tour operators provide online accessibility.	0	2	6	56	265	329	94	4.7000
(b) Process Innovations									
6	Tour operators begin and finish visit in stipulated time.	0	0	0	48	290	338	97	4.8286
7	Tour operators provide essential support services during visit such as good hotel for lunch /dinner, clean lavatories etc.	1	0	9	124	175	309	88	4.4143
8	Tour operators provide the tourists feedback system.	0	0	3	44	290	337	96	4.8143
9	Tour operators avail trustworthy sightseeing transportation and return journey arrangement.	4	36	30	52	125	247	71	3.5286
10	Tour operators create the visitors group on mobile and remain in touch with all of them whole through days of tour.	6	6	18	88	165	283	81	4.0429
(c) Service/ Product Innovations									
11	Tour operators provide efficient pick up and drop services.	0	2	3	76	245	326	93	4.6571

12	Tour operators provide guided experiences to tourists.	0	0	9	128	175	312	89	4.4571
13	Tour operators are fully prepared for emergency services, if any.	0	2	24	88	195	309	88	4.4143
14	In order to save time of visitors, tour operators arrange for certain facilities well in advance through mobile app such as placing order for food at hotel, booking room for stay, booking entry tickets at place of visit.	0	14	30	108	130	282	81	4.0286
15	Tour operators provide sufficient visit time to various sports during tour.	0	0	27	80	205	312	89	4.4571
(d) Marketing Innovations									
16	Travel agency has developed its own mobile app for customer's view.	0	2	36	100	160	298	85	4.2571
17	Travel agency provides tourist services at competitive rates.	0	2	36	100	160	298	85	4.2571
18	Travel agency has developed good relations and connectivity in hotels and places of tourist attractions.	0	2	9	140	155	306	87	4.3714
19	Travel agency focuses on visitors' satisfaction /value for money.	0	8	27	104	155	294	84	4.2000
20	Travel agency has developed affordable tour packages for intended tourists providing home-to-home tourism services.	1	10	33	140	90	274	78	3.9143

*Source: Field work***Percentage to Total:** Row total divided by weighted value of total respondents.**Mean:** Row total divided by total respondents.

Figure 1.1
Role of Tour Operator



The table shows the role of the tour operators in each category in terms of organizational innovations, process innovations, services and product innovations, and marketing innovations. The score of the respondents' statements regarding the role of tour operators in the study area was measured. The score for an individual statement would range between 70 and 350. A score below 210 means an unfavourable opinion, a score of exactly 210 means a natural attitude and a score near about 350 shows the most favourable opinion.

A) **ORGANIZATIONAL INNOVATIONS:** This type includes work distribution, communication with stakeholders, decision-making skills, professionalism, and online accessibility.

1. **The first statement concerns work distribution among Tour operators.** The response to this statement shows a favourable attitude of tour operators because the total score value is 324, i.e., 93%, and the mean is 4.6286. This shows the uniformity of the given response for Tour Operators. This reflects a modernized approach to operational efficiency.
2. **Tour operators are constantly in touch with tourism agents.** This statement shows a favourable response towards the tour operators because the total score value is 303, i.e., an 87 percent value, and the mean is 4.3286. This indicates room for improvement in collaboration.
3. **Decision-making Skills:** The response shows the favourable responses of Tour operators, with a value of 321, 92 percentage points, and a mean of 4.5857. It suggests that they believe tour operators excel in on-the-spot decision-making, suggesting a high level of competency in dynamic environments.
4. **Professionalism:** A large proportion of respondents' responses are in this statement, which shows a favourable attitude towards tour operators because the total score value is 331, i.e., 95% value, and the

mean is 4.7286. So, it agrees that tour operators should adopt a professional approach, reinforcing the Importance of professionalism in tourism services.

5. **Online Accessibility:** The response to this statement shows that 329 respondents, 94% of the Tour operators, appreciate online accessibility provided by tour operators, emphasizing the need for digital solutions in the industry.
- B) **PROCESS INNOVATION:** This type of Tour Operator's role includes Timelines, Support services, a Feedback system, Transportation Reliability, and Group Communication.
6. **Timelines:** The majority of the respondents used timelines during the trip. Tour operators begin and finish visits in the stipulated time. The response to this statement shows the favourable attitude of tour Operators because the total score value is 338, i.e., 97%, and the mean is 4.8286. It confirms that tour operators adhere to stipulated timelines, showcasing service reliability.
7. **Support Services:** In this statement, the Tour operators provide essential support services during the visit, such as a good hotel for lunch /dinner, clean lavatories, etc. The response shows a favourable attitude toward the Tour operators because the total score value is 309, i.e., 88%, and the mean value is 4.4143. so, they acknowledge that tour operators provide essential support services during visits; this leaves a significant portion of respondents satisfied, indicating an area for potential increases.
8. **Feedback System:** Tour operators provide the tourists with a feedback system. This statement shows the highest responses. Its total score is 337 (96%), and the mean is 4.8143. It shows the strong agreements regarding providing a tourist feedback system, highlighting the Importance of feedback in improving services.
9. **Transportation Reliability:** Tour operators offer trustworthy sightseeing transportation and return journey arrangements. The responses to this statement are near natural attitudes because the total score is 247, the percentage to total is 71, and the mean value is 3.5286. It shows that a substantial number (71%) are less satisfied with transportation arrangements, suggesting that this is a critical area needing improvement.
10. **Group Communication:** Tour operators create the visitors' group on mobile and remain in touch with all of them throughout the tour. The response to this statement is favourable because the total score value is 283, i.e., the 81-percentile value, and the mean value is 4.0429. It shows that group communication indicates a need for better engagement strategies among tourists during tours.
- C) **SERVICES/ PRODUCT INNOVATION:** The role of Tour operators includes pick-up and drop-off services, Guide experiences, Emergency Preparedness, Pre-arranged facilities, and visiting time.
11. **Pick-Up and Drop-Off Services:** Tour Operators' role includes pick-up and drop-off services. Most of the responses are responses to this statement. The total score value is 326, the 93-percentage to total and the Mean value is 4.6571. A majority (93%) are satisfied with the efficiency of pick-up and drop-off services, demonstrating a positive perception of this aspect.
12. **Guided Experiences:** Tour operators provide guided experiences to tourists. In this statement, responses favour the Tour operators because the total score value is 312, i.e., the percental value is 89, and the Mean value is 4.4571. There is moderate satisfaction with guided experiences.
13. **Emergency Preparedness:** Tour operators are fully prepared for emergency services. The total score value is 309, i.e., 88 percentiles, and the mean value is 4.4143. While 88% agree that tour operators are prepared for emergencies, this highlights the Importance of safety protocols.
14. **Arranged facilities:** Purpose: Tour operators arrange certain facilities through mobile apps to save time. The response for this statement is that the total score value is 282, i.e., the 81-percentile value, and the mean value is 4.0286. So, it has been found that the pre-arrangement facilities work better for Smart Tourism.
15. **Visit time:** Tour operators provide sufficient visit time to various sports during the tour. The responses in this statement show favourable attitudes toward the Tour operators because the total score value is 312, which is the 89th percentile value, and the mean value is 4.4571.

- D) **MARKETING INNOVATION:** This type of role includes Mobile Application Development, Competitive rates, Connectivity with Hotels, a focus on Visitor satisfaction, and Affordable Packages.
16. **Mobile App Development:** Travel agencies have developed their own mobile app for customers' viewing. In this statement, the response is a favourable attitude. It was found that the 298 total score value, 85 percentile value, and the mean value is 4.2571. so, the responses are satisfied regarding the mobile apps, which means the respondents prefer the services
17. **Competitive Rates:** Travel agencies provide tourist services at competitive rates. In this statement, satisfied responses are shown a total score value of 298, i.e., the 85th percentile value, and the mean value is 4.2571. So, the perceptions of competitive pricing (85%) suggest that travellers get better deals with tour operators.
18. **Connectivity with Hotels:** The Travel agency has developed good relations and connectivity in hotels and places of tourist attractions. This statement response is favourable because the total score value is 306, i.e., 87 percentiles, and the mean value is 4.3714. The majority of 87% appreciate good relations with hotels, indicating that strong partnerships are beneficial.
19. **Visitors Satisfaction Focus:** The travel agency focuses on visitors' satisfaction /value for money. The above statements show that the satisfied score has a total score of 294, 84 is the percentile value, and the mean value is 4.2000. A focus on visitor satisfaction is acknowledged by 84%, indicating that agencies recognize the Importance of providing value for money
20. **Affordable Packages:** The travel agency has developed affordable tour packages for intended tourists to provide home-to-home services. The most favourable response was 78% regarding the affordable packages, so it was found that better pricing strategies attract a border audience.
- So, while organizational and process innovations have many strengths, significant areas for improvement exist, particularly in communication, support services, transportation reliability, and marketing strategies. Enhancing these aspects could increase customer satisfaction and loyalty in the tourism industry.

8. Challenges Faced By Tour Operators:

Despite their importance, tour operators face several challenges:

- Intense competition from online travel platforms
- Changing tourist preferences
- High operational costs
- Dependency on external factors (pandemics, climate, political conditions)
- Need for digital skills and technological investment

Addressing these challenges requires innovation, training, and policy support.

9. Findings:

- Tour operators are vital intermediaries in the tourism system
- They significantly contribute to destination development and employment
- Adoption of digital tools has transformed their operational role
- Sustainable practices enhance long-term tourism benefits
- Government and institutional support are essential for strengthening tour operators
- The role of tour operators is agreed upon chiefly with all the statements. They need only focus on trustworthy sightseeing transportation and return journey arrangements for tourists and also on tourists providing home-to-home tourism services.

10. Suggestion:

1. Travel agencies should provide a single booking platform where travellers can manage both their outbound and return journeys, including transfers from home to the airport and vice versa. By focusing on integration, local expertise, and personalized support, travel agencies can transform return journey

arrangements and home-to-home services into a competitive advantage that boosts customer satisfaction and loyalty.

2. Tour operators should implement smart panels in a travel agency. They can significantly enhance operational efficiency, improve customer service, and provide innovative solutions that make booking and managing travel easier. Whether through self-service kiosks, interactive booking systems, or personalized travel recommendations, smart panels can transform the customer journey, streamline agency workflows, and ultimately increase customer satisfaction and sales. Travel agencies can implement several strategies to manage long-term off-seasons effectively.
 - a. To optimize staffing and service quality, they should adjust staffing levels by reducing the number of employees while ensuring high service standards. Cross-train staff to handle multiple roles, allowing for greater flexibility in operations. Additionally, focus on attracting alternative guests such as business travellers, locals seeking staycations, and visitors attending events or destination weddings.
 - b. The hotel owner should offer discounted rates for extended stays to attract guests looking for temporary residences or relaxing getaways. Providing vacation rental-style accommodations can be particularly appealing during the off-season.
 - c. They should also organize events that cater to off-season visitors, such as local festivals, harvest celebrations, holiday-themed gatherings, or food and drink festivals that align with the destination's ambiance.
 - d. They should utilize hotel facilities as venues for corporate meetings, conferences, and team-building retreats. Many companies prefer off-season bookings due to lower rates and reduced crowds, making it an ideal opportunity to attract business clients.

11. Conclusion:

Tour operators play a multifaceted role in tourism development by connecting tourists with destinations, promoting economic growth, supporting sustainability, and adopting smart technologies. In the changing tourism landscape, their role is expanding from traditional package sellers to experience creators and destination managers. Strengthening tour operators through training, technology adoption, and policy support will ensure sustainable and inclusive tourism development.

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Impact of Awareness and Satisfaction of Digital Payments on Financial Inclusion in India**Dr. Netaji Dnyanu Dabade**

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The economic development objectives of India include achieving financial inclusion as a vital target. The United Payments Interface together with mobile banking and debit and credit cards and digital wallets has created better access to official financial services. The research utilizes secondary data which the Reserve Bank of India and NPCI and World Bank and Government of India publications provide to investigate how people understand and their satisfaction with digital payments impact financial inclusion in India until 2025. The study results demonstrate that when users gain more knowledge about digital payments and achieve higher levels of satisfaction their digital payment usage increases while they gain better access to banking services and Direct Benefit Transfers and they decrease their cash usage which leads to higher financial inclusion rates in India.

Keywords: Digital Payments, Awareness, Satisfaction, Financial Inclusion, India.

1. Introduction

Financial inclusion provides people with access to budget-friendly financial services which include banking and credit and savings and insurance and payment systems. The program in India seeks to deliver basic banking services to underserved communities so they can join the formal financial sector. A major section of the population including rural residents and women and small business operators faced financial exclusion from the formal financial system during many years because they lacked financial knowledge and had low incomes and lived far from banking services and possessed limited financial skills. The Government of India together with financial institutions launched multiple initiatives to establish banking facilities and drive financial inclusion throughout the country.

The financial sector has experienced major changes because of technological advancements which have occurred during the last few years. Digital payment systems which include mobile banking internet banking debit and credit cards digital wallets and the Unified Payments Interface (UPI) have created better access to financial services. User awareness about the systems together with their level of satisfaction form the primary factors which determine whether people will adopt and keep using these systems. The study investigates how people in India choose to use digital payment systems based on their level of awareness and system satisfaction.

2. Review of Literature

The existing literature reveals that digital payment systems bring about financial efficiency and financial inclusion by reducing transaction costs, providing transparency, and increasing cashless access to banking services (RBI, 2024). The substantial increase in scale and scope of recent digital platforms like UPI and mobile banking has helped in easing and speeding up financial transactions. Studies also show importance of cognizance and digital awareness while discussing the adoption of digital payments systems (OECD, 2022).

Research further shows that user satisfaction depends on three main factors which include ease of use and speed and security and reliability. Digital payments enable financial inclusion because they provide rural populations and women and low-income groups with better access to financial services (World Bank 2024). The present study investigates three areas which previous studies have not examined together because they study awareness and satisfaction and financial inclusion.

3. Objectives of the Study

1. To study the growth of digital payment systems in India.
2. To analyse awareness of digital payment systems in India.
3. To examine satisfaction levels of digital payment users.
4. To assess the impact of awareness and satisfaction on financial inclusion in India.

4. Research Methodology

The study uses descriptive and analytical research methods. The study is based on secondary data. The researchers collected data from the RBI reports and NPCI and World Bank Global Findex and government publications. The data cover recent trends up to 2025. The researchers used percentage and trend analysis to present their findings.

5. Digital Payment Systems in India

Digital payment systems in India have experienced rapid growth during the past ten years because of technological progress, government support programs, and rising smartphone and internet service usage. The financial sector received transformation through these advancements which introduced customers to new financial transaction methods that offered them increased speed and better security.

The Unified Payments Interface (UPI) has become the most popular digital payment system because it provides users with an easy-to-use platform that charges them minimal transaction fees. Financial transactions have become simpler because UPI and mobile banking and internet banking and debit and credit cards and digital wallets provide users with multiple payment options. The Digital India initiative and Pradhan Mantri Jan Dhan Yojana program have enabled better access to financial services through digital payment methods.

6. Awareness of Digital Payment Systems in India

Awareness is very important to start using digital payment systems. Awareness levels across the country have been significantly increased by government campaigns, banking initiatives and the growing use of smartphones.

Table 1
Awareness of Digital Payment Systems in India (%)

Digital Payment Mode	Awareness Level (%)
UPI	92
Debit Cards	88
Mobile Banking Apps	81
Internet Banking	76
Digital Wallets	69
Credit Cards	55

(Reserve Bank of India (2024, 2025); NPCI (2025); World Bank Global Findex Database, 2024)

The table clearly indicates the highest level of awareness in India for Unified Payment Interface because it is a most commonly used digital payment method. People recognize debit cards and mobile banking services but their knowledge about credit cards and digital wallets remains limited. Rural and low-income users demonstrate decreased knowledge because they face both access limitations and security concerns. The overall awareness of digital payments throughout the country increased until it reached its peak point in 2025 because of technological advancements and digital literacy programs and government initiatives.

7. Satisfaction towards Digital Payment Systems

The constant use of digital payment systems is influenced by user satisfaction. Satisfaction levels are positively affected by factors such as convenience, transaction speed, ease of use and cost effectiveness.

Table 2
Satisfaction Level of Digital Payment Users in India (%)

Satisfaction Parameter	Satisfied Users (%)
Ease of Use	89
Transaction Speed	91
Convenience	93
Cost Effectiveness	85
Security & Safety	78
Customer Support	70

(Reserve Bank of India (2024); NPCI Annual Report (2025); Ministry of Finance, Government of India, 2024)

The table shows that users are highly satisfied with digital payment systems because they provide convenience and fast transactions and easy-to-use interfaces. Digital payment usage increases when user satisfaction reaches higher levels which then builds their trust in the system. Users show lower satisfaction with security and customer support because they have concerns about data protection and fraud. Therefore, better security and customer service will help organizations build user trust which will result in more users continuing to use their services.

8. Impact of Digital Payments on Financial Inclusion

Awareness and satisfaction with digital payments is mainly contributing towards more financial inclusion in India.

Table 3
Impact of Digital Payments on Financial Inclusion in India (%)

Financial Inclusion Indicator	Improvement (%)
Increase in Bank Account Usage	87
Access to Digital Transactions	82
Reduction in Cash Dependency	74
Inclusion of Rural Population	68
MSME Participation	71
Direct Benefit Transfer Reach	90

(World Bank Global Findex Database (2024, 2025); Reserve Bank of India (2025); NITI Aayog, 2024)

The table shows that financial inclusion in India receives positive effects from digital payment systems. The usage of Direct Benefit Transfers and bank accounts has reached higher levels because digital payment systems. The systems enable users to access banking services, receive benefits without delay, and perform secure cashless transactions. Digital payments provide support to rural communities and small enterprises while boosting financial participation throughout the population.

9. Findings of the Study

- The rapid growth of digital payment systems in India has occurred due to three factors which include technological progress, government backing and the growth of digital payment systems. The UPI system together with mobile banking services and digital wallet solutions has achieved widespread adoption throughout both urban and rural regions.
- The government programs together with financial literacy initiatives and increased smartphone usage have resulted in people becoming more aware of different digital payment methods. The increased awareness of digital payment systems has enabled users to comprehend system advantages and proper system functionality.

- High user satisfaction results from three main factors which include convenient services and quick transaction processing and user-friendly interfaces. Digital payment platforms become more popular because these factors make it easy for users to return to their services. Users build their confidence in digital financial systems through their ongoing usage of these systems.
- Increased awareness together with user satisfaction improvements lead to better financial inclusion outcomes. The two factors together lead to increased usage of formal financial services while decreasing cash usage. The two factors together allow more people to access digital payment systems.
- Digital payment systems drive economic development by enabling complete access. The systems enable Direct Benefit Transfers while providing better banking services to rural areas and underserved communities. The systems enable Micro Small and Medium Enterprises together with small business owners to join the formal market.

10. Suggestions

- The digital awareness programs and financial literacy programs should be improved through specific campaigns and training workshops and community-based programs. The project should concentrate on rural and semi-urban regions to enhance people's understanding of digital payment systems and their ability to use these systems safely.
- The digital payment system needs better security systems and stronger regulatory frameworks to protect against cyber threats and fraud. The organization must educate its users on secure digital payment methods to protect its systems and build user trust.
- Develop simple digital payment platforms which users find easy to operate. The system needs to offer regional language support which will enable all users including beginners and elderly people to operate the system easily.
- The grievance redressal systems require improvement through three essential elements which include rapid response times and transparent operations and efficient customer assistance. The implementation of these features will improve user trust between digital payment services and their customers.

11. Conclusion

The research shows that digital payment system awareness together with user satisfaction creates a significant effect on financial inclusion progress throughout India. Digital payments enable users to access formal banking services while increasing their bank account usage and delivering Direct Benefit Transfers on schedule and decreasing their need for cash payments. The organization delivers secure financial services to rural communities and MSMEs and disadvantaged groups through its affordable service offerings. India needs ongoing policy backing together with technological advancements and stronger cybersecurity measures and public awareness campaigns to achieve financial inclusion and promote inclusive economic growth.

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**Economic Role of MSMEs and Start-ups in India: Challenges, Growth,
and the Vision of Viksit Bharat 2047****Mrs. Sujata Chandrashekhar Bhasme**

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Abstract:

Micro, Small and Medium Enterprises (MSMEs) and the start-up ecosystem play a decisive role in shaping India's economic transformation and achieving the vision of Viksit Bharat 2047. This paper examines the economic role of MSMEs within India's development framework, analyzes the growth and significance of the Indian start-up ecosystem, identifies key challenges affecting these sectors, and assesses their strategic contribution toward inclusive and sustainable national development. Based on secondary data from books, journals, research articles, and official reports, the study highlights MSMEs' contributions to employment generation, GDP, exports, regional balance, innovation, and self-reliance. It also emphasizes the start-up ecosystem's role in technological advancement, digital transformation, entrepreneurship, and global competitiveness. Despite policy support, MSMEs and start-ups face constraints related to finance, technology, skills, infrastructure, and regulatory compliance. The study concludes that strengthening MSMEs and start-ups is essential for fostering inclusive growth, economic resilience, and long-term development in India's journey toward becoming a developed nation by 2047.

Keywords: MSMEs, Start-ups, Economic Development, Viksit Bharat 2047, Entrepreneurship, Inclusive Growth

Introduction:

India's long-term national vision of **Viksit Bharat 2047** envisions the transformation of the country into a developed, inclusive, innovation-driven, and self-reliant economy by the centenary year of Independence. Achieving this ambitious goal requires strengthening the foundational pillars of the Indian economy, among which **Micro, Small and Medium Enterprises (MSMEs)** and the **start-up ecosystem** occupy a central position. These sectors are widely recognized as engines of employment generation, entrepreneurship development, technological innovation, and balanced regional growth.

MSMEs constitute the backbone of India's industrial and service sectors, contributing substantially to gross domestic product, exports, and livelihood creation. Their widespread presence across rural, semi-urban, and urban regions enables inclusive growth by integrating local resources, traditional skills, and emerging technologies into the formal economic framework. At the same time, the rapid expansion of the Indian start-up ecosystem has repositioned India as a global hub of innovation, fostering digital transformation, knowledge-based industries, and new-age business models.

In recent years, policy initiatives undertaken by the Government of India, such as *Startup India, Make in India, Digital India*, and *Atmanirbhar Bharat*, have significantly enhanced the institutional and regulatory environment for MSMEs and start-ups. These initiatives aim to simplify compliance, improve access to finance, encourage innovation, and strengthen domestic manufacturing and services. Despite these policy efforts, MSMEs and start-ups continue to face multiple structural and operational challenges, including financial constraints, technological gaps, regulatory complexities, and market access limitations.

Against this backdrop, the present study seeks to examine the economic role of MSMEs within India's development framework, analyze the growth and significance of the Indian start-up ecosystem, identify key challenges affecting these sectors, and assess their strategic contribution toward achieving the objectives of Viksit Bharat 2047. By synthesizing insights from secondary sources, the study aims to provide a

comprehensive and analytical understanding of how MSMEs and start-ups can act as transformative agents in India's journey toward sustainable and inclusive national development.

Objectives of the study

The study is conducted with the following objectives:

1. To examine the economic role of MSMEs in India's development framework.
2. To analyse the growth and significance of the Indian start-up ecosystem.
3. To identify the major challenges faced by MSMEs and start-ups.
4. To assess the strategic contribution of MSMEs toward achieving Viksit Bharat 2047.

Methodology of the study:

The present study is descriptive and analytical in nature and is based entirely on secondary data. Information has been collected from books, research journals, scholarly articles, government reports, and official websites related to MSMEs and start-ups. The data has been analyzed through logical interpretation and synthesis to draw meaningful conclusions.

Concept of MSME

MSME stands for Micro, Small and Medium Enterprises. These are business entities classified based on their investment in plant and machinery or equipment and annual turnover, as defined under the Micro, Small and Medium Enterprises Development (MSMED) Act, 2006, revised in 2020 by the Government of India.

The Government of India revised the definition of Micro, Small and Medium Enterprises (MSMEs) with effect from 1 July 2020 by introducing a composite criterion based on both investment and annual turnover. This revised classification applies uniformly to manufacturing as well as service enterprises, removing the earlier distinction between the two sectors. Under the new definition, a Micro Enterprise is one where the investment in plant and machinery or equipment does not exceed ₹1 crore and the annual turnover does not exceed ₹5 crore. A Small Enterprise is defined as an enterprise with investment up to ₹10 crore and turnover up to ₹50 crore. Similarly, a Medium Enterprise is one with investment up to ₹50 crore and turnover up to ₹250 crore. It is important to note that both conditions—investment and turnover—must be satisfied simultaneously for an enterprise to qualify under a specific category. This revised definition aims to promote growth, ease of doing business, and better access to government benefits for MSMEs.

Concept of Start-up Ecosystem

The concept of a start-up ecosystem refers to a dynamic and interconnected network of individuals, institutions, policies, and resources that collectively support the creation, growth, and sustainability of start-up enterprises. It represents the overall environment in which new and innovative businesses are formed, financed, nurtured, and scaled.

A start-up ecosystem typically includes entrepreneurs, investors (angel investors and venture capitalists), incubators, accelerators, educational institutions, mentors, government agencies, financial institutions, technology platforms, and regulatory bodies. These components interact with one another to provide funding, infrastructure, knowledge, market access, and policy support necessary for entrepreneurial success.

In the Indian context, initiatives such as Startup India, Digital India, Make in India, and Atmanirbhar Bharat have strengthened the start-up ecosystem by simplifying compliance procedures, offering tax incentives, and improving access to funding. A strong start-up ecosystem fosters technological advancement, job creation, global competitiveness, and sustainable development.

Economic Role of MSMEs in India's Development Framework

Micro, Small and Medium Enterprises (MSMEs) play a crucial role in India's economic development by contributing to growth, employment, and inclusive development. Their economic significance can be explained as follows:

1. Employment Generation

MSMEs are among the largest generators of employment in India after agriculture. They provide job opportunities to skilled, semi-skilled, and unskilled workers at relatively low capital cost, helping to reduce unemployment and underemployment.

2. Contribution to Gross Domestic Product (GDP)

MSMEs contribute significantly to India's GDP by supporting industrial production and service activities. Their widespread presence across sectors strengthens the overall economic output.

3. Promotion of Inclusive Growth

MSMEs promote inclusive and equitable economic growth by encouraging entrepreneurship among women, youth, and marginalized communities, thereby supporting social and economic inclusion.

4. Balanced Regional Development

MSMEs are widely dispersed across rural and semi-urban areas. This helps reduce regional imbalances, prevents excessive urban migration, and promotes local economic development.

5. Export Promotion

A substantial share of India's exports originates from MSMEs, particularly in sectors such as textiles, leather, engineering goods, handicrafts, and pharmaceuticals. This strengthens foreign exchange earnings and improves trade balance.

6. Support to Large Industries

MSMEs act as ancillary units to large-scale industries by supplying components, raw materials, and services. This integration enhances industrial efficiency and supply chain resilience.

7. Entrepreneurship Development

MSMEs encourage entrepreneurial culture by enabling individuals to start businesses with limited capital. They act as training grounds for future entrepreneurs and innovators.

8. Utilization of Local Resources

MSMEs efficiently utilize local raw materials, skills, and traditional knowledge, thereby supporting sustainable and region-specific development.

9. Technological Innovation and Adaptability

MSMEs demonstrate flexibility and adaptability in adopting new technologies and processes, particularly in niche markets, contributing to innovation-driven growth.

10. Poverty Reduction and Income Generation

By generating employment and self-employment opportunities, MSMEs play an important role in poverty alleviation and improvement of living standards.

11. Contribution to Atmanirbhar Bharat

MSMEs support self-reliance by promoting domestic production, reducing import dependence, and strengthening indigenous manufacturing capabilities.

12. Resilience during Economic Shocks

Due to their flexible operations, MSMEs can quickly adapt to changing market conditions, thereby enhancing economic resilience during crises.

Growth and Significance of the Indian Start-up Ecosystem

The Indian start-up ecosystem has witnessed remarkable growth over the past decade and has emerged as one of the largest and most dynamic entrepreneurial ecosystems in the world. Its growth and significance can be explained as follows:

1. Rapid Growth in Number of Start-ups

India has experienced a sharp increase in the number of start-ups across diverse sectors such as fintech, edtech, healthtech, agritech, e-commerce, and artificial intelligence. This growth reflects a strong entrepreneurial culture and increasing innovation activity.

2. Global Position and Recognition

India has emerged as one of the top start-up hubs globally, attracting international attention and investment. The country hosts a large number of unicorn start-ups, enhancing its global economic standing.

3. Innovation and Technological Advancement

Start-ups are key drivers of innovation, introducing new technologies, digital platforms, and disruptive business models that improve efficiency and productivity across industries.

4. Employment Generation

The start-up ecosystem has become a significant source of employment, particularly for skilled professionals in technology, management, and research, thereby contributing to human capital development.

5. Growth of Venture Capital and Funding

Increased availability of venture capital, angel investment, and government funding has strengthened start-up financing and enabled scalability and sustainability of new ventures.

6. Digital Transformation of the Economy

Start-ups play a central role in India's digital transformation by expanding digital payments, e-commerce, online education, telemedicine, and digital financial services.

7. Supportive Government Policies

Initiatives such as Startup India, Digital India, Make in India, and Atmanirbhar Bharat have simplified regulatory processes, offered tax incentives, and created a favorable environment for entrepreneurship.

8. Regional Expansion Beyond Metros

The start-up ecosystem is expanding beyond major metropolitan cities to Tier-II and Tier-III cities, promoting balanced regional development and reducing urban concentration.

9. Strengthening of MSME and Industrial Ecosystem

Start-ups complement MSMEs by providing technological solutions, improving supply chains, and fostering innovation within traditional industries.

10. Attraction of Foreign Investment

The vibrant start-up ecosystem attracts significant foreign direct investment (FDI), contributing to capital formation and global economic integration.

11. Promotion of Entrepreneurial Culture

Start-ups encourage risk-taking, creativity, and problem-solving among youth, fostering a culture of entrepreneurship and innovation.

12. Contribution to Atmanirbhar and Viksit Bharat

By promoting domestic innovation, import substitution, and global competitiveness, the start-up ecosystem supports India's goals of self-reliance and long-term economic development.

Major Challenges Affecting MSMEs and Start-ups in India

Despite their significant contribution to economic development, MSMEs and start-ups in India face several structural, financial, and operational challenges. These challenges hinder their growth, sustainability, and global competitiveness. The major challenges are explained below:

- Limited Access to Finance :** MSMEs and start-ups often face difficulties in obtaining timely and affordable finance due to lack of collateral, limited credit history, and high perceived risk by financial institutions. This restricts their capacity for expansion and innovation.
- High Cost of Credit :** Even when credit is available, interest rates are often higher for small enterprises compared to large firms, increasing financial stress and reducing profitability.
- Regulatory and Compliance Burden :** Complex regulatory procedures, multiple registrations, and frequent compliance requirements increase administrative costs and discourage entrepreneurial growth.
- Inadequate Technological Adoption :** Many MSMEs lack access to modern technology, digital infrastructure, and automation tools, leading to low productivity and reduced competitiveness.
- Skill Gaps and Managerial Deficiencies :** Shortage of skilled manpower and limited managerial expertise in areas such as finance, marketing, and operations adversely affect business efficiency and scalability.
- Market Access Constraints :** MSMEs and start-ups often struggle to access domestic and international markets due to limited branding, marketing capabilities, and distribution networks.

7. **Intense Competition** : Competition from large domestic firms and multinational corporations poses significant challenges, particularly in terms of pricing, quality, and technological superiority.
8. **Delayed Payments** : Delayed payments from buyers, especially large corporations and government agencies, adversely impact cash flows and working capital management.
9. **Infrastructure Deficiencies** : Inadequate physical infrastructure such as power supply, transportation, logistics, and industrial facilities increases operational costs and reduces efficiency.
10. **Limited Research and Development (R&D)** : MSMEs and start-ups often lack sufficient resources for R&D activities, restricting innovation and product development.
11. **Cybersecurity and Data Protection Risks** : Increased digitalization exposes enterprises to cybersecurity threats, data breaches, and technological vulnerabilities.
12. **Global Market Challenges** : Compliance with international quality standards, intellectual property protection, and global trade regulations presents additional challenges for exporting enterprises.
13. **Business Sustainability and Survival Risks** : High failure rates due to market uncertainty, limited experience, and financial instability remain a critical concern, especially during initial years.

MSMEs' Strategic Contribution toward Achieving *Viksit Bharat 2047*

Micro, Small and Medium Enterprises (MSMEs) play a **pivotal and strategic role** in realizing the vision of *Viksit Bharat 2047*, which aims to transform India into a **developed, inclusive, innovative, and self-reliant economy** by the centenary of Independence. Their contributions can be explained as follows:

1. **Employment Generation and Inclusive Growth** : MSMEs are the largest employment generators after agriculture. They provide jobs to millions across rural, semi-urban, and urban areas, thereby reducing unemployment, poverty, and regional imbalances—key goals of *Viksit Bharat 2047*.
2. **Balanced Regional Development** : MSMEs promote industrialization in backward and rural regions by utilizing local resources and skills. This helps in reducing migration to cities and ensures geographically balanced economic development.
3. **Strengthening 'Make in India' and 'Atmanirbhar Bharat'** : MSMEs are the backbone of domestic manufacturing and supply chains. By reducing import dependence and boosting indigenous production, they support national self-reliance—an essential pillar of *Viksit Bharat*.
4. **Contribution to GDP and Economic Growth** : MSMEs significantly contribute to India's GDP and industrial output. Their expansion enhances overall economic productivity and supports India's transition to a high-income economy by 2047.
5. **Export Promotion and Global Integration** : MSMEs contribute substantially to India's exports, especially in textiles, handicrafts, engineering goods, pharmaceuticals, and IT services. Their global integration strengthens India's position in global value chains.
6. **Innovation and Entrepreneurship Development** : MSMEs and start-ups foster innovation, creativity, and entrepreneurship. Adoption of new technologies, digital platforms, and innovative business models accelerates India's move toward a knowledge-driven economy.
7. **Digital Transformation and Formalization** : With initiatives like Udyam Registration, digital payments, and e-commerce platforms, MSMEs are becoming more formal, transparent, and efficient—aligning with the vision of a modern and digitally empowered India.
8. **Support to Sustainable and Green Growth** : MSMEs increasingly adopt eco-friendly practices, renewable energy, and sustainable production methods. This supports environmental sustainability and India's climate commitments under the *Viksit Bharat* framework.
9. **Women and Youth Empowerment** : MSMEs provide entrepreneurial opportunities to women and youth, promoting social equity, leadership, and financial independence—critical for inclusive national development.
10. **Resilience and Economic Stability** : MSMEs enhance economic resilience by diversifying production and reducing dependence on a few large industries. This strengthens India's ability to withstand global economic shocks.

11. **Skill Development and Human Capital Formation** : MSMEs act as training grounds for skill development, apprenticeships, and on-the-job learning, contributing to a skilled workforce essential for a developed nation.
12. **Alignment with Government Development Policies** : MSMEs effectively implement development initiatives of the Government of India, ensuring last-mile delivery of economic reforms and inclusive growth strategies.

Conclusion

MSMEs are not merely economic units but **strategic nation-building partners**. By driving employment, innovation, exports, sustainability, and inclusiveness, MSMEs form the **foundation of India's journey toward Viksit Bharat 2047**—a prosperous, self-reliant, and globally competitive nation. MSMEs' strategic contribution toward employment generation, innovation, exports, sustainability, and inclusive growth positions them as key drivers in India's journey toward becoming a developed nation. Strengthening MSMEs and start-ups through coherent policies and effective implementation by the Government of India will not only accelerate economic growth but also ensure that development remains inclusive, resilient, and future-oriented. Thus, MSMEs and start-ups are not merely economic entities but vital partners in nation-building and in realizing the long-term aspirations of **Viksit Bharat 2047**.

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Role of Commerce and Trade in Achieving Viksit Bharat–2047

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Abstract

The vision of Viksit Bharat–2047 represents India's commitment to becoming a developed, self-reliant, and globally competitive nation by the centenary of its independence. Commerce and trade form the backbone of this transformation by enabling production efficiency, market expansion, employment generation, and international economic integration. This paper examines how commerce and trade contribute to economic growth, industrial development, digital expansion, and inclusive progress in India. Special emphasis is placed on domestic trade reforms, export–import policies, digital commerce, MSMEs, and entrepreneurship. The study also highlights policy initiatives such as GST, Make in India, Digital India, and export promotion schemes that strengthen India's commercial framework. The paper concludes that a resilient, technology-driven, and sustainable commerce and trade system is essential for realizing the long-term objectives of Viksit Bharat–2047.

Keywords: Commerce, Trade, Economic Growth, Viksit Bharat–2047, Digital Economy etc.

1.1 Introduction

Commerce and trade are essential components of a nation's economic structure, influencing production, distribution, and consumption activities. In India, the growth of commerce has played a significant role in supporting industrial expansion and service sector development. The vision of **Viksit Bharat–2047** aims to transform India into a developed, self-reliant, and inclusive economy. Achieving this vision requires a strong and efficient commercial framework. Trade facilitates market integration, employment generation, and income growth across regions. Technological advancements have further reshaped commercial practices through digital platforms and e-commerce. Domestic and international trade enhances competitiveness and encourages innovation. Policy reforms have strengthened India's trading environment. Therefore, commerce and trade remain vital instruments in achieving sustainable national development by 2047.

1.2 Review of Literature

- 1) **Sharma (2018)** analyzed the role of commerce in economic development and concluded that an efficient commercial system enhances market connectivity and supports industrial growth. The study emphasized that trade reforms improve productivity and contribute to long-term economic stability.
- 2) **Patil and Deshmukh (2019)** examined the impact of domestic trade on regional development in India. Their findings revealed that well-developed internal trade networks reduce regional disparities and promote balanced economic growth.
- 3) **Rao (2020)** studied the influence of digital commerce on Indian businesses and found that e-commerce platforms have expanded market access for small and medium enterprises. The research highlighted digital trade as a key driver of inclusive growth.
- 4) **Kaur (2021)** evaluated India's export performance and its contribution to economic resilience. The study concluded that export diversification and policy support strengthen global competitiveness and foreign exchange earnings.
- 5) **Mehta and Joshi (2022)** explored the relationship between trade policy reforms and ease of doing business in India. The research indicated that simplified regulations and improved logistics significantly enhance trade efficiency and economic performance.

1.3 Objectives of the Study

- 1) To examine the role of commerce and trade in supporting India's economic growth and development in the context of Viksit Bharat-2047.
- 2) To analyze how trade reforms and commercial activities contribute to employment generation, market expansion, and global competitiveness of the Indian economy.

1.4 Research Methodology

The present study is based on a **descriptive and analytical research design** aimed at understanding the role of commerce and trade in achieving the objectives of Viksit Bharat-2047. The study primarily relies on **secondary data** collected from government reports, policy documents, research journals, books, and official publications related to commerce and trade. Data have been analyzed using qualitative analysis and simple comparative techniques to interpret trends and patterns. Relevant government initiatives and trade indicators have been examined to assess their contribution to economic development. The methodology ensures clarity, reliability, and academic relevance, enabling meaningful conclusions to be drawn regarding the significance of commerce and trade in national development.

1.5 Data Analysis

The data analysis is carried out in accordance with the objectives of the study, focusing on the role of commerce and trade in economic development and their contribution to employment generation and global competitiveness under the vision of **Viksit Bharat-2047**. Secondary data from policy reports and published studies reveal that commerce and trade have significantly supported India's GDP growth through the expansion of domestic markets and international trade. The analysis also shows that trade-related activities have created large-scale employment opportunities, particularly in MSMEs, logistics, retail, and digital commerce sectors. Furthermore, trade reforms and export promotion initiatives have enhanced India's global market presence and competitiveness.

Table 1.1: Objective-wise Analysis of Commerce and Trade

Objectives of the Study	Analytical Observations
To examine the role of commerce and trade in economic growth	Commerce and trade have contributed to GDP growth through market expansion, improved supply chains, and increased business activity.
To analyze the contribution towards employment and competitiveness	Trade activities have generated employment and improved India's global competitiveness through exports and trade reforms.

1.6 Result and Discussion

Table 1.1 demonstrates that the study's stated objectives have been successfully achieved. Commerce and trade show a strong and positive influence on India's economic growth. Expansion of commercial activities has improved market efficiency and business performance. Trade-related sectors have contributed significantly to employment generation across various industries. Increased participation of MSMEs and service sectors has strengthened income opportunities. Export growth has enhanced India's presence in global markets. Trade reforms have improved competitiveness and productivity. Digital commerce has further accelerated economic integration. These developments collectively promote sustainable growth. Hence, commerce and trade play a vital role in realizing the vision of **Viksit Bharat-2047**.

1.7 Findings

The study reveals that commerce and trade significantly contribute to India's economic development. Expansion of domestic trade has strengthened internal market connectivity. International trade has enhanced foreign exchange earnings and global market access. The growth of digital commerce has increased business

efficiency and consumer reach. Trade-related activities have generated substantial employment opportunities. MSMEs have benefited from improved market access and policy support. Trade reforms have simplified business operations and reduced transaction costs. Improved logistics and infrastructure have supported trade growth. Commerce has encouraged entrepreneurship and innovation. Overall, commerce and trade play a crucial role in achieving the objectives of Viksit Bharat–2047.

1.8 Suggestion

The government should further strengthen trade-friendly policies to encourage business growth. Digital infrastructure must be expanded to support e-commerce and online trade. Special financial assistance should be provided to MSMEs for market expansion. Skill development programs should be aligned with the needs of the trade sector. Export promotion strategies need continuous improvement for global competitiveness. Logistics and transportation facilities should be modernized to reduce costs. Simplification of regulatory procedures will enhance ease of doing business. Sustainable and green trade practices should be promoted. Public–private partnerships can support commercial development. Continuous monitoring of trade reforms is essential for achieving Viksit Bharat–2047.

1.9 Conclusion

The study concludes that commerce and trade are fundamental to India's development journey. Strong commercial activities support economic growth and market expansion. Trade plays a vital role in employment generation and income creation. Digitalization has transformed traditional business practices. Policy reforms have improved efficiency and competitiveness. MSMEs have emerged as key contributors to trade growth. Improved infrastructure has strengthened domestic and international trade. Global integration has enhanced India's economic resilience. Sustainable trade practices are essential for long-term progress. Thus, commerce and trade are crucial in realizing the vision of **Viksit Bharat–2047**.

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A Study of Contract Farming Agreements and Their Implications on Poultry Growers**Miss. Dipali Hindurao Chavan**Assistant Professor Department
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Dipali.chavan87@gmail.com**Prof (Dr) T. D. Mahanwar**Dean and Head, Faculty of Commerce and Management
Karmaveer Bhaurao Patil University, Satara.**Abstract**

Contract farming has been identified as a significant institutional pattern in the poultry industry, especially in developing nations such as India. It connects poultry farmers with the integrator firm using an agreement that outlines the conditions of input delivery, technical assistance, pricing, and marketing. This paper investigates the nature of contract farming and its implications for poultry farmers. It discusses the advantages of contract farming, which include market guarantees, risk mitigation, and the use of advanced technology, as well as the disadvantages, which include price dependence, asymmetry, and inflexibility. The paper concludes that contract farming improves the stability of income and efficiency but requires proper regulatory mechanisms to ensure the interests of poultry farmers are protected.

Keywords: Contract Farming, Poultry Industry, Income Stability, Risk Sharing, Agri business.

1.Introduction

The poultry industry has emerged as one of the rapidly expanding areas of the agricultural sector. In India, the poultry industry has moved from backyard poultry to integrated commercial poultry farming. Organized companies like Suguna Foods, Venky's, and Skylark Hatcheries follow contract farming systems where poultry farmers rear birds owned by contract farming companies. In contract farming agreements, the contract farming company provides day-old chicks, feed, vaccines, and technical services, and the farmer provides infrastructure, labor, electricity, and water. The contract farming company owns the birds and buys the end product. The contract farming system minimizes market risks for the farmer but makes them dependent on companies. The research was conducted because, although contract poultry farming is a significant sector for earning revenues and rural employment, it has generated several problems for farmers. Although it provides market security and technical support, farmers are often confronted with problems such as imbalance in bargaining power, low profit margins, increased dependence on contract farming companies, increased costs of inputs, and lack of transparency in performance assessment and payment terms.

2. Review of Literature

Bhende M. J. (2006) made an attempt to analyse the cost of production, net profit from broiler and constraints in broiler farming. 60 farms from the districts of Bangalore rural districts and Shimoga districts were selected as the sample. He concluded that small medium and large farms are facing problems of delayed payment from wholesalers and commission agents. Also delay in lifting the birds was another major problem.

Selvakumar S. N. (2006) conducted a study to identify the constraints in eggs and broiler production in Tamil Nadu state. 90 layer farmers and 120 broiler farmers were selected as sample. In his study it is found that major problem faced by contract farmers was difficulty in labour management and inadequate infrastructural facilities.

Murthy and Bindhu M. (2013), in their study on "A case study on Suguna poultry production through contract farming in Andhra Pradesh, he mentioned that a contract farming has become going increasingly in

Agri business and poultry sector. Contract poultry farming is beneficial to agricultural farmers as well as integrated companies.

Nirbhavne M. B. (2020), published their research article on “Impact of covid-19 on poultry farming in Maharashtra with special reference to Nashik district”. In his research he focused on challenges faced by poultry farmers and he suggested that government should take all possible measures to improve the conditions of poultry farmers and provide financial support to them. The researcher suggested that the government should take strong supportive measures and provide adequate financial assistance to improve the condition of poultry farmers.

3. Statement of the Problem:

Contract poultry farming has emerged as a significant model for poultry farming; but, there are some challenges faced by the growers in this system. Although contract farming ensures guaranteed marketing and technical assistance, factors such as low profit margins, increasing costs of inputs and operations, lack of transparency in the payment and assessment systems, and high reliance on the integrator companies impact the economic viability of the growers. Most growers are also in doubt about the extent to which contract farming can enhance their socio-economic conditions. Thus, there is a need to assess the efficacy, equity, and profitability of contract poultry farming arrangements and their influence on the lives of poultry growers.

3. Objectives of the Study

1. To study the structure and terms of contract poultry farming agreements between integrator companies and growers.
2. To analyze the socio-economic implications of contract farming on poultry growers, particularly in terms of income, dependency, and profitability.

4. Research Methodology

The current research work entitled “A Study of Contract Farming Agreements and Their Implications on Poultry Growers” is mainly grounded on primary data collected from contract poultry growers. The research work was carried out in two chosen talukas of Satara district, where the number of contract poultry farms is relatively higher. From these two talukas, a total of 40 contract poultry growers were chosen as sample respondents. Convenience sampling was mainly used due to time constraints, and random sampling was used wherever possible to have better representation. The primary data was collected using a structured questionnaire prepared on a five-point Likert scale to gauge the perceptions of contract growers about contract agreements and their socio-economic implications. Personal interviews were also conducted to collect detailed information and to ensure accuracy and precision of the responses. Secondary data was collected from books, research journals, government publications, company literature, and appropriate internet resources on contract farming and poultry management. The collected data were systematically classified and tabulated for analysis. Simple statistical tools such as percentages, mean, and standard deviation were used to interpret the data and to identify the key issues and implications of contract farming agreements on poultry growers in the selected study area.

5. Analysis and Interpretation of the Data

The following table presents the descriptive statistics related to contract poultry farming agreements and their socio-economic implications on poultry growers in the selected study area. The responses were collected from 30 contract poultry growers using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The statements were designed to assess growers' perceptions regarding the clarity of contract terms, transparency in payment and performance evaluation, dependency on integrators, profitability, and overall socio-economic impact. To analyze the responses, descriptive statistical tools such as mean and standard deviation were applied. The mean value indicates the average level of agreement among the respondents, while the standard deviation shows the extent of variation in their opinions. Higher

mean scores reflect stronger agreement with the given statement, whereas lower mean scores indicate disagreement. The analysis helps in identifying the major concerns and implications associated with contract poultry farming agreements in the study area.

Table:

Descriptive Statistics for Contract Poultry Farming Agreements and Their Socio-Economic Implications on Poultry Growers

Factors	N	Mean	Mean Rank	Std. Dev.
The terms and conditions of the contract agreement are clearly explained to me before signing.	40	3.66	V	1.154
The payment structure (growing charges and incentives) mentioned in the contract is transparent.	40	3.73	III	1.311
The integrator company follows the agreed contract terms fairly.	40	3.46	VII	1.07
The performance evaluation system (FCR, mortality rate, weight gain) is transparent and unbiased.	40	3.73	III	1.25
The contract provides a proper mechanism for resolving disputes between growers and the company.	40	3.91	I	1.14
Contract farming has improved my income stability.	40	3.60	VI	1.16
The profit earned under contract farming is satisfactory.	40	2.95	X	1.89
I feel highly dependent on the integrator company for my poultry business.	40	3.55	VII	1.0
Rising input and operational costs reduce my overall profitability.	40	3.86	II	.973
Contract poultry farming has improved my overall socio-economic status.	40	3.36	IX	1.10
Valid N (listwise)	40			

Source: Primary Data

The descriptive statistics of the contract poultry farming agreement and the socio-economic implications (N = 40) reveal a mixed attitude of the growers. The highest mean score is found for the statement that the contract has a proper mechanism for dispute resolution (Mean = 3.91), followed by the concern that the rise in input and operational costs affects the overall profitability (Mean = 3.86), which reflects strong agreement on cost pressures. Moderate agreement is found regarding the transparency of payment structure and performance appraisal (Mean = 3.73 each), as well as understanding the terms of the contract before entering into it (Mean = 3.66). The growers also moderately agree that contract farming enhances income stability (Mean = 3.60) and that they are dependent on the integrator companies (Mean = 3.55). However, perceptions of fairness in following contract terms (Mean = 3.46) and improvement in overall socio-economic status (Mean = 3.36) are comparatively lower. The lowest mean score is recorded for satisfaction with profit earned under contract farming (Mean = 2.95) with a high standard deviation (1.89), indicating considerable variation in profitability experiences. Overall, while contract farming ensures structural support and relative income stability, profitability concerns and rising costs remain major challenges affecting the socio-economic advancement of poultry growers.

6. Findings:

1. From the study, it is evident that contract poultry farming helps in providing structural support to farmers, especially in the area of conflict resolution (Mean = 3.91) and transparency in payment and performance evaluation systems (Mean = 3.73 each). The farmers also enjoy a relative sense of income stability (Mean = 3.60), which indicates that the contract farming system provides a certain level of financial security to the farmers.

2. Despite these benefits, growers face significant challenges related to profitability. Rising input and operational costs (Mean = 3.86) adversely affect earnings, and satisfaction with profit under contract farming is comparatively low (Mean = 2.95), showing that although the system offers stability, it does not guarantee satisfactory profit margins.

7. Suggestions:

1. The structure of profit-sharing and the growing charge in the integrator companies needs to be modified by taking into account the increasing costs of inputs and operations. This will help increase the profitability of the growers.
2. There should be greater efforts to enhance growers' autonomy and awareness through regular training programs, clear communication of contract terms, and independent monitoring mechanisms. Establishing a joint grievance redressed committee with grower representation can further strengthen trust, fairness, and long-term sustainability of contract poultry farming.

8. Conclusion

It is that concluded contract poultry farming agreement and socio-economic implications for poultry farmers shows that the contract farming system ensures structural stability and institutional support for farmers. The existence of mechanisms for dispute resolution, relatively transparent payment terms, and performance evaluation systems positively influence growers' confidence in the contract system. Furthermore, contract poultry farming ensures a certain level of income stability, which is less prone to market risks and uncertainties compared to independent poultry farming. However, the analysis also shows that there are major challenges, especially with regard to profitability. Increased costs of inputs and operations significantly lower net profits, and growers are dissatisfied with the level of profit made from the contract system. The high level of dependence on integrator companies also limits growers' autonomy. While contract farming makes a moderate contribution to improving the socio-economic status of growers, the economic advancement of growers is limited by cost and profit constraints.

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Study of Fintech in India**Miss. Borate Jyotsna Pandurang**

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Abstract

Financial Technology (FinTech), a convergence of finance and technology, has emerged as a transformative force in India's financial ecosystem. Over the past two decades, the sector has evolved from the adoption of core banking solutions in the early 2000s to a digitally empowered landscape driven by innovations such as the National Payments Corporation of India's IMPS and the revolutionary Unified Payments Interface (UPI). Government-led initiatives including Pradhan Mantri Jan Dhan Yojana (PMJDY), Aadhaar-enabled e-KYC, the JAM Trinity, and regulatory frameworks introduced by the Reserve Bank of India (RBI) have significantly strengthened Digital Public Infrastructure (DPI), fostering financial inclusion and innovation.

This study examines the evolution and growth trajectory of the fintech industry in India, highlighting its key milestones, ecosystem pillars (payments, lending, insurance, and investment management), technological enablers such as Artificial Intelligence (AI), Machine Learning (ML), Blockchain, Big Data, Cloud Computing, and Robotic Process Automation (RPA), and the major drivers accelerating its expansion. The research also analyses critical challenges including regulatory complexities, cybersecurity risks, unethical digital lending practices, intense competition, and the need to build consumer trust.

Based on secondary data sources such as research papers, journals, articles, and official reports, the study concludes that India's fintech sector is positioned for sustained growth, supported by favourable demographics, strong government backing, rising customer adoption, and continuous technological advancement. However, ensuring responsible innovation, regulatory compliance, digital literacy, and enhanced cybersecurity measures will be crucial for achieving inclusive and sustainable growth in the coming years.

Key Words : FinTech, Digital Public Infrastructure (DPI), Financial Inclusion, Unified Payments Interface (UPI), Artificial Intelligence (AI), Blockchain, Digital Lending, InsurTech, Regulatory Sandbox, Financial Innovation

Introduction

Fintech is a combination of the terms "finance" and "technology". The technology and innovation in it challenges the traditional methods, in this industry technology plays a vital role in terms of finance. FinTech is utilized to facilitate companies, business owners and consumers for the better management of their financial operations, processes, and lives by utilizing specialized software that are used on computers and other alike electronic devices. The FinTech sector has played a pivotal role in shaping the financial landscape of India by offering a faster and easier mode of credit delivery through digital technology and innovation. This has made credit accessible to consumers across demographic, geographical, and socio-economic segments, thereby helping expand the scope of financial inclusion. Now at the cusp of its next evolution, the FinTech sector is geared to add incremental value by triggering financial inclusion across various segments.

The growth of the FinTech sector in India is also being assured by the government through interventions such as Unified Payments Interface (UPI), Open Network for Digital Commerce (ONDC) and Public Tech Platform for Frictionless Credits (PTPFC). The existing developments (public and private) are further catalysed with the implementation and integration of emerging technologies such as artificial intelligence (AI) and machine learning (ML) and Blockchain technology. To broaden the accessibility of financial services and ensure smoother transactions, the FinTech sector is also consistently prioritising the development of neobanks, integration of financial services with e-commerce platforms, InsurTech, and other initiatives. The Reserve Bank of India (RBI) and the Ministry of Finance (MoF) have been taking a

progressive approach in fostering the Indian FinTech landscape. With the conceptualisation of platforms such as the regulatory sandbox, hackathons and Finteraction, the authorities are leaving no stone unturned to boost the growth of the sector through multi- stakeholder participation and public private partnerships.

Objective of Study

This study examines the evolution and growth of the fintech industry in India, highlighting its key milestones, emerging trends, and the major challenges shaping the sector.

Research Methodology

This study is based on secondary sources of data such as articles, books, journals, research papers, websites and other sources.

Evolution of FinTech in India

Fintech's origins in India date back to the early 2000s, when banks began adopting digital solutions to boost efficiency and customer experience. The rollout of core banking solutions (CBS) digitized operations, minimizing reliance on manual processes. True momentum built in the 2010s with the rise of digital payments and mobile banking. A pivotal milestone was the National Payments Corporation of India (NPCI) launching the Immediate Payment Service (IMPS) in 2010, which ushered in real-time digital transactions.

One of the most significant milestones in the growth of fintech in India was the demonetization drive in November 2016, which triggered a rapid shift toward digital payments. The withdrawal of high-value currency notes created an urgent demand for alternative payment methods, bringing fintech companies such as Paytm, PhonePe, and Google Pay to the forefront. Around the same time, the Unified Payments Interface (UPI), launched by the National Payments Corporation of India (NPCI) in 2016, emerged as a game-changer by offering a seamless, interoperable, and real-time payment system. UPI revolutionized peer-to-peer (P2P) and merchant transactions, and its exponential growth highlighted the increasing acceptance of digital payments among consumers and businesses.

In parallel, the Indian government's emphasis on financial inclusion through initiatives such as the Pradhan Mantri Jan Dhan Yojana (PMJDY) further accelerated the fintech revolution. By expanding access to banking services for unbanked populations, PMJDY created new opportunities for fintech firms to design innovative financial products tailored to underserved segments. This transformation was further supported by the widespread availability of affordable smartphones and low-cost internet connectivity, which enabled digital financial services to reach a broader population.

Key Pillars of Ecosystem of Fintech

1. **Payments:** This rapidly growing function can be defined as “all payments that are initiated, processed and received electronically. The adoption of digital payment systems offers significant benefits to consumers by enhancing convenience, speed, and efficiency. In comparison to traditional cash-based transactions, digital payments reduce exposure to theft and other cash-related crimes, thereby improving transactional security (Rahman, Ismail, & Bahri, 2020).
 1. Mobile banking is the access to banking services via a mobile phone and it is an e- payment subcategory.
 2. Peer-to-peer (P2P) payments are as well attached to digital payments, allowing payments between private individuals.
 3. Another relevant and innovative concept is e-wallet, which “is a payable device without the use of cash or money”
2. **Credit and Lending:** There is a surge of online platforms matching lenders and borrowers. Online funding platforms are known as crowdlending or crowdfunding. The main idea is raising funds through the provision of small credits by small investors in an online platform. There are different classes of crowdfunding platforms; debt and equity crowdfunding, donation-based crowdfunding and reward crowdfunding. The emergence of financing via online platforms has decreased transaction costs, enabling the financing of small businesses, therefore increasing financial inclusion

3. **Insurance Services:** ‘Insurtech’ is used to refer to those firms operating in the insurance industry using the latest technology. There are no further motivations for research, since there are not many important disruptions. Instead, there are improved existing insurance products and services. Another assertion is that Insurtech firms have entered the market by collaborating with incumbents rather than replacing them. Robo-advisory disruptions in the insurance sector are the emerging innovators, being capable of lowering costs while increasing quality and transparency.
4. **Investment Management:** Digital investment means making investment decisions in new assets, securities, commodities, etc. or the management of a portfolio using technological devices.
 1. Mobile trading: way for investors to invest and manage portfolios via mobile devices anywhere and anytime.
 2. Social trading: it “allows making investment decisions based upon information gathered in online communities” (Doering, Neumann, & Paul, 2015).
 3. Online brokerage: means giving the same services as traditional brokers but via online. Therefore, they are independent from time and place.
4. **High frequency trading (HFT):** It falls under the B2B context. It is understood as “investors using computers to trade securities over extremely short time intervals”. (Biais and Foucault, 2014)

Digital Financial Technology

1. **Artificial Technology:** Artificial Intelligence (AI) has become an integral component of financial services by simulating human decision-making processes. It enhances customer interaction through the use of chatbots and virtual assistants, improves transaction security by detecting fraud and anomalies, and provides personalised financial advice by tailoring recommendations to individual customer needs.
2. **Big Data:** Big data analytics involves the examination of large and complex datasets to uncover hidden patterns, market trends, and customer preferences. Financial institutions leverage these insights to make data-driven decisions, customise their offerings, and identify new market opportunities.
3. **Machine Learning:** Machine learning (ML) algorithms continually improve their accuracy by learning from new data. They excel in financial forecasting, credit scoring, and the development of investment strategies by identifying patterns and making predictions that human analysts might otherwise miss.
4. **Robotic Process Automation:** This technology automates routine and repetitive tasks, thereby increasing operational efficiency by reducing the need for human intervention. It also helps cut costs and minimise errors in activities such as data entry and report generation.
5. **Cloud computing:** This technology offers financial institutions a scalable, flexible, and cost-effective infrastructure. It supports extensive data storage, advanced analytics capabilities, and uninterrupted service delivery, thereby facilitating growth and innovation without the need for heavy upfront investments.
6. **Blockchain:** This technology provides a decentralised and secure mechanism for recording and verifying various types of transactions. It has the potential to reduce fraud, accelerate settlement processes, and enhance transparency across activities ranging from currency transfers to the maintenance of shareholder records.
7. **Internet of Things:** The Internet of Things (IoT) connects everyday devices to the internet, enabling the collection of valuable data. This data can be leveraged to offer more personalised services, improve risk management, and enhance decision-making processes.
8. **Open-Source SaaS:** This technology provides customisable and flexible software solutions for financial institutions while reducing costs. It also offers scalability, enabling organisations to quickly adapt and expand their services in response to changing market conditions and regulatory requirements.

Key Drivers of Fintech Growth

- 1. Internet and mobile penetration:** As of early 2026, India has rapidly expanded its digital infrastructure, with approximately **958 million active internet users**, making it one of the world's largest online populations. This growth has been driven in part by strong rural adoption, with **around 57 % of users from rural areas** (about 548 million) and an overall **internet penetration rate of over 70 %**. Additionally, the country has **over 1.03 billion internet users and more than 1.06 billion active mobile connections**, reflecting the widespread availability of mobile connectivity. Furthermore, **4G network coverage now reaches roughly 95 % of the population**, significantly enhancing access to digital services across both urban and rural regions.
- 2. India's Aadhaar System, e-KYC and simplified account opening:** As of early 2026, India's Aadhaar system continues to serve as the backbone of the country's Digital Public Infrastructure (DPI), with over **1.42 billion Aadhaar numbers generated by September 2025**. Over time, the system has evolved into a high-speed, paperless authentication framework, enabling instant and secure electronic Know Your Customer (e-KYC) processes. This has significantly simplified financial account opening and enhanced access to digital financial services across the country.
- 3. Funding support to Startups:** As of early 2026, the funding landscape for Indian startups has shown signs of recovery, with deep tech and sectors aligned with national priorities driving renewed momentum. Although private investment experienced a modest year-on-year decline of approximately 8% in 2025, falling to around USD 11 billion, government-backed initiatives and increased public market activity have provided significant support. These developments have helped stabilise the startup ecosystem and encouraged sustained innovation and long-term growth.
- 4. Govt Initiative and Regulations:** The Indian government and financial regulators—including the Reserve Bank of India (RBI), the Securities and Exchange Board of India (SEBI), and the Insurance Regulatory and Development Authority of India (IRDAI)—actively support the growth of fintech through robust infrastructure development and progressive regulatory frameworks. Foundational initiatives such as the Unified Payments Interface (UPI), Aadhaar-based e-KYC, Digi Locker, and the Account Aggregator framework have fostered a resilient digital ecosystem that enables innovation while ensuring consumer protection. A major institutional step was the establishment of the **RBI's Fintech Department in 2022**, which was created to promote innovation, oversee regulation, and supervise initiatives such as Central Bank Digital Currencies (CBDCs) and digital banking units. To further encourage innovation, the RBI and other regulators have introduced a **Regulatory Sandbox**, allowing fintech firms to test new products and services in a controlled environment under regulatory oversight. The government has also invested heavily in Digital Public Infrastructure, notably through the JAM Trinity (Jan Dhan– Aadhaar–Mobile), UPI, and related digital public goods, which have expanded financial access and interoperability across the economy. In addition, the RBI has promoted industry-led governance through a Self-Regulatory Organization (SRO) framework, recognising bodies such as the Fintech Association for Consumer Empowerment.
- 5. Conducive Funding Environment:** India currently offers a highly conducive environment for fintech funding and ranks as the **third-largest fintech ecosystem globally in terms of total funding raised in 2025**, trailing only the United States and the United Kingdom. The funding landscape, however, has transitioned from a phase of rapid, valuation-driven expansion to a “reset” phase that emphasises profitability, regulatory compliance, and strong fundamental business metrics. Despite a global funding slowdown, Indian fintech has demonstrated strong resilience, with funding growing marginally by approximately **2% year-on-year to reach USD 2.4 billion in 2025**. Investor behaviour has become more selective, with increased interest in wealthtech—which recorded a **257% surge in funding in 2025**—and in secured lending models. While early-stage funding rose significantly to USD 1.2 billion, seed-stage investments declined, reflecting a cautious yet focused investment approach. At the same time, momentum in public markets has strengthened, with a notable wave of fintech initial public offerings (IPOs) expected in 2026, as firms such as KreditBee, MoneyView, and Fibe prepare for

listings following the successful 2025 IPOs of companies like Groww and Pine Labs. Geographically, Bengaluru continues to dominate the fintech ecosystem, attracting 42%–47% of total funding, followed by Mumbai and Gurugram.

6. **Greater Customer Adoption:** India boasts the world's highest fintech adoption rate at **87%**, significantly surpassing the global average of **64%**. This widespread adoption has been driven by the rapid digitisation of financial services, particularly through platforms such as UPI and digital wallets. Supported by rising smartphone penetration and high-speed internet connectivity, fintech growth is transforming key segments including payments, lending, and investment services. The sector is on track to achieve an estimated **USD 1 trillion in assets under management (AUM) by 2030**, with especially strong adoption among younger users and in urban centres.
7. **Cost Effectiveness:** Fintech in India has achieved significant cost effectiveness by leveraging technology to replace manual processes, reduce overheads associated with physical branch networks, and streamline operations through tools such as artificial intelligence, data analytics, and cloud computing. With over **6,000 fintech firms** operating in the country, the sector extensively utilises India's Digital Public Infrastructure (DPI)—including **UPI, Aadhaar-based authentication, and the Account Aggregator framework**—to substantially lower user onboarding and transaction costs.
8. **Favourable Demographics:** India's fintech sector is strongly supported by a significant demographic dividend, with over **65% of the population under the age of 35**, driving widespread adoption of digital financial services. A young, salaried, and tech-savvy user base—of which **approximately 65% falls within the 18–35 age group**—has accelerated the penetration of UPI, digital payments, and digital lending platforms. Coupled with rapid smartphone adoption, these trends are collectively steering India toward a **50% non-cash economy by 2026**.
9. **Advancement in Technology:** Fintech in India is undergoing rapid transformation, driven by the expansion of Digital Public Infrastructure (DPI) such as UPI, along with advancements in AI-powered lending and regulatory technology (RegTech). The sector is projected to reach a valuation of USD 150–200 billion by 2025. Key developments—including AI-driven personalised financial services, blockchain-based solutions, and embedded finance—are strengthening efficiency and innovation, positioning India as a global leader in the fintech ecosystem.

Challenges of Fintech

The FinTech sector in India is not just growing, but thriving, with a rapidly expanding user base and a market value of \$2.1 trillion. This Industry is a key driver of digital adoption, bridging the gap between digital banking, microfinance, and peer-to-peer lending platforms. The more than 4.2k emerging FinTech start-ups are a testament to this growth, catering to the specific needs of underserved market segments. Furthermore, the swift expansion of online commerce and the rising need for digital services create a favourable environment for FinTech firms to provide customized solutions. However, along with this digital revolution comes many challenges for this Industry

1. **Building customer trust and Education:** Establishing credibility and trust is crucial for any FinTech company, but it can be challenging. Since the Industry is still relatively new, people tend to be sceptical about entrusting their finances to a company without a proven track record. While technology is essential in FinTech, it is equally vital to invest in people to build customer credibility and trust. This includes offering remarkable *customer service* and sustaining transparent communication throughout the customer journey. Unfortunately, many companies prioritize technology over people, leading to dissatisfied customers and a damaged reputation.
2. **Regulatory Hurdles:** Fintech companies in India face complex regulatory and compliance hurdles, primarily driven by evolving RBI, SEBI, and IRDAI regulations, strict KYC/AML mandates, and the Digital Personal Data Protection (DPDP) Act, 2023
3. **High Initial Costs:** Implementing AI-driven solutions often requires significant upfront investments in technology, data infrastructure, and talent, which can be a barrier for smaller financial institutions.

4. **Cyber Security threat:** The financial services industry deals with sensitive information regarding individuals and businesses. The rise of fintech has made more data available in digital formats, allowing for more accessible analysis and insights.
5. **Unethical Practices in Digital Lending:** The proliferation of illegal lending apps that employ harsh recovery methods has led to stricter regulatory scrutiny and, in some cases, widespread crackdowns on the entire sector.
6. **Intense Competition:** In a crowded market, customer acquisition becomes expensive, while startups face immense pressure to secure funding amid tightening investor sentiment.

Conclusion

India's fintech industry stands at the cusp of a transformative era, poised for exponential growth and innovation. The sector's rapid ascent is fueled by a potent combination of cutting-edge technological advancements, widespread digital adoption across urban and rural landscapes, a young and tech-savvy demographic, and a supportive regulatory framework that encourage innovation while ensuring consumer protection. This unique convergence of factors has created a fertile ground for fintech companies to thrive and disrupt traditional financial services. To ensure optimal penetration of fintech services among the masses, it is important to conduct awareness drives about new fintech products, educate people about their operational mechanisms, and inform them about redressal measures in case of cyber fraud.

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Fortified Financial Architectures: Structural Reforms as Institutional Bedrock for Viksit Bharat 2047**Dr. Sandeep Salunke**

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Email Id – sandeepsalunke93@gmail.com**Abstract**

A robust and flexible financial architecture is essential to the Viksit Bharat 2047 vision's goal of turning India into a developed economy. According to this report, financial architecture is an institutional ecosystem that includes fiscal restraint, digital financial infrastructure, capital market deepening, banking sector resilience, and regulatory control. The research empirically investigates the effect of financial reforms in bolstering macroeconomic stability, inclusive growth, and investor confidence. It is based on institutional theory, financial intermediation theory, and endogenous growth theory.

A mixed-method explanatory research methodology was used to gather primary data from 150 stakeholders, including academicians, policy analysts, entrepreneurs, and financial experts. The Reserve Bank of India, NITI Aayog, the Ministry of Finance, the World Bank, and the International Monetary Fund were the sources of secondary data. Cronbach's Alpha was used to evaluate reliability, and internal consistency ($\alpha > 0.78$ across constructs) was confirmed. Multiple regression analysis was used in SPSS to evaluate the hypotheses.

The findings show that financial sector changes have a substantial impact on investor confidence ($\beta = 0.47, p < 0.001$), inclusive growth ($\beta = 0.44, p < 0.001$), and economic stability ($\beta = 0.39, p < 0.001$). The results demonstrate that strong financial infrastructures are the institutional cornerstones of India's long-term success.

Keywords: Financial Architecture, Institutional Theory, Financial Reforms, Viksit Bharat, Endogenous Growth.

Introduction

The path to becoming a developed nation necessitates systematic institutional strengthening in addition to GDP growth. The complexity and resilience of economic growth are determined by financial architecture, which is the interconnected network of capital markets, financial intermediaries, regulatory frameworks, and digital infrastructures. In addition to effectively allocating capital and mobilising savings, a strong financial system also reduces systemic risks, improves transparency, and builds investor trust. From liberalisation in 1991 to modern digital financial advances, India's reform path illustrates a changing institutional paradigm. The fundamental underpinnings of financial governance have changed as a result of landmark reforms including the Insolvency and Bankruptcy Code (2016), banking consolidation, the introduction of the GST, the growth of digital payments, and capital market transparency measures. These changes represent a shift from an administratively regulated financial sector to one that is technology-enabled, market-responsive, and heavily regulated.

But rather than being a finished goal, financial transformation is a continuous process. Capital flow volatility, fintech disruptions, climate-related financial risks, and emerging global uncertainties all need for flexible regulatory frameworks and forward-thinking institutional solutions. Structural vulnerabilities, including fiscal imbalances, cyclical non-performing assets, and unequal access to financing, continue to exist despite reform advancements. Thus, it is essential to use empirical research to evaluate the systemic

efficacy, sustainability, and inclusivity of financial changes in order to determine how they would contribute to the Viksit Bharat goal in the long run.

➤ Theoretical Framework

• Institutional Theory

According to institutional theory, economic performance is shaped by formal regulations, governance frameworks, and regulatory standards. Stable expectations, increased credibility, and lower transaction costs are all benefits of strong institutions. Financial reforms reinforce macroeconomic underpinnings by institutionalising accountability, transparency, and enforcement procedures.

• Financial Intermediation Theory

Financial institutions use this idea to redirect savings into profitable investments and reduce information asymmetry. Systemic resilience and intermediation efficiency are increased by reforms that strengthen capital sufficiency, asset quality standards, and risk governance.

• Endogenous Growth Theory

Human capital, innovation, and institutional quality are highlighted by endogenous growth models as factors that contribute to long-term economic growth. Long-term growth paths are aided by digital financial inclusion, which increases loan availability, encourages entrepreneurship, and boosts productivity.

• Conceptual Framework

Independent Variables:

- Financial Reform Effectiveness (FRE)
- Digital Financial Inclusion (DFI)
- Regulatory Strengthening (RS)

Dependent Variables:

- Economic Stability (ES)
- Inclusive Growth (IG)
- Investor Confidence (IC)

According to the paradigm, developmental outcomes are substantially predicted by institutional reform factors.

➤ Objectives of the Study

1. To analyze the institutional impact of financial reforms on macroeconomic stability.
2. To examine the relationship between digital financial inclusion and inclusive growth.
3. To evaluate regulatory strengthening as a determinant of investor confidence.
4. To empirically assess the contribution of financial architecture to Viksit Bharat.

➤ Hypotheses

H1: Financial Reform Effectiveness positively influences Economic Stability.

H2: Digital Financial Inclusion positively influences Inclusive Growth.

H3: Regulatory Strengthening positively influences Investor Confidence.

➤ Research Methodology

- **Research Design** : Explanatory research design using quantitative methodology supported by secondary institutional data.
- **Sample**
 - Sample Size: 150
 - Sampling Technique: Stratified random sampling
 - Respondent Distribution:
 - Finance Professionals (40%) Entrepreneurs (30%)
 - Academicians (30%)

- **Instrument Development** : Structured questionnaire using 5-point Likert scale.

Construct validation followed:

- Content validity through expert review
- Reliability via Cronbach's Alpha
- Multicollinearity checks (VIF < 5)

➤ **Reliability and Validity Testing**

- **Cronbach's Alpha**

Construct	Alpha
Financial Reform Effectiveness	0.842
Digital Financial Inclusion	0.816
Regulatory Strengthening	0.788
Economic Stability	0.854
Inclusive Growth	0.801
Investor Confidence	0.829

All constructs exceed the 0.70 threshold, confirming internal consistency.

➤ **Data Analysis and Results**

- **Descriptive Statistics**

Mean scores indicate strong respondent agreement regarding reform effectiveness (M = 4.12) and digital inclusion impact (M = 4.08).

Correlation Analysis

Variables	ES	IG	IC
FRE	0.621**	0.588**	0.602**
DFI	0.514**	0.667**	0.498**
RS	0.575**	0.521**	0.689**

All independent variables show significant positive correlations with dependent variables ($p < 0.01$), confirming preliminary support for hypotheses.

- **Multiple Regression Analysis**

Model 1: Economic Stability

Predictor	Beta	Sig
FRE	0.39	0.000
RS	0.31	0.002
DFI	0.18	0.021

48.2% of the variance in Economic Stability can be explained by Model 1 ($R^2 = 0.482$), and overall significance has been established ($F = 45.32$, $p < 0.001$). The biggest predictor is Financial Reform Effectiveness ($\beta = 0.39$, $p < 0.001$), suggesting that governance enhancements and structural banking reforms significantly increase macroeconomic resilience. The significance of supervisory credibility is emphasised by the considerable contribution of Regulatory Strengthening ($\beta = 0.31$, $p = 0.002$). The effect of digital financial inclusion is less but substantial ($\beta = 0.18$, $p = 0.021$). H1 is therefore supported.

Model 2: Inclusive Growth : 51.6% of the variation is explained by Model 2 ($R^2 = 0.516$). The most significant predictor ($\beta = 0.44$, $p < 0.001$) is digital financial inclusion, underscoring the revolutionary function of technology-enabled financial access in fostering equal development. Financial inclusion strategies have a direct impact on distributive outcomes, as evidenced by the increased explanatory power compared to Model 1. H2 is supported.

Model 3: Investor Confidence : With $R^2 = 0.533$, Model 3 has the most explanatory power. The most significant predictor ($\beta = 0.47$, $p < 0.001$) is regulatory strengthening, indicating that investor opinion is largely influenced by institutional credibility and enforcement ability. H3 is supported.

Integrated Interpretation

The results show several reform paths: investor confidence is anchored by regulatory credibility, inclusive growth is driven by digital inclusion, and stability is reinforced by structural changes. Affirming its fundamental role in realising the Viksit Bharat vision, the rising R^2 values ($0.482 \rightarrow 0.516 \rightarrow 0.533$) indicate that financial architecture has the greatest influence on market confidence, followed by inclusion and macroeconomic stability.

➤ Discussion

The results support the institutional idea that systemic stability is improved by more robust regulatory frameworks. The effectiveness of financial intermediation, strengthened by reforms, improves capital allocation and reduces risk concentration. By including under-represented groups into established financial institutions, digital financial inclusion serves as an endogenous development stimulus.

The actual data demonstrates that strengthened financial infrastructures serve as the cornerstones for structural change rather than just being regulatory tweaks.

➤ Policy Implications

1. Make macroprudential regulatory structures stronger.
2. Develop digital infrastructure in semi-urban and rural areas.
3. Encourage environmentally friendly and sustainable financial products.
4. Strengthen regulatory oversight based on data (SupTech).
5. Establish long-term fiscal consolidation procedures.
6. Strengthen bond market growth and capital market diversity.
7. Combine digital inclusion tactics with financial literacy.
8. Create early warning systems and dynamic stress testing.
9. Encourage MSME credit formalisation by working with fintech.
10. Improve the monetary and fiscal agencies' institutional cooperation.

Concluding Remark

This paper offers empirical proof that banking sector changes have a major positive impact on investor confidence, inclusive growth, and economic stability. The results, which are based on endogenous growth and institutional growth theories, confirm that strong financial architectures serve as the cornerstones of India's structural change. The statistical findings highlight the systemic significance of institutional coordination, digital financial development, and regulatory strengthening in promoting long-term resilience.

Technological integration, inclusive financial democratisation, adaptable governance frameworks, and continuous reform momentum will be essential as India moves closer to the Viksit Bharat 2047 goal in order to guarantee macroeconomic stability and development results that are competitive on a global scale.

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Future of The Indian Education System in India 2047: Skills Over Degrees**Mr. Charudatta D. Gunde**

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Abstract

The Indian education system has traditionally emphasized formal qualifications over demonstrable competencies resulting in systematic misalignment between the skills of graduates and the requirements of the contemporary economy. With the approaching centenary of independence in 2047, there is an urgent need to reorient education towards skills-based frameworks rather than degree-based frameworks for the purpose of enhancing economic competitiveness, ensuring social equity and promoting lifelong learning. This study investigates the conceptual foundations of a skills-centric education ecosystem, discusses various implementation models and analyzes the anticipated socio-economic implications on the nation. It outlines a holistic framework that incorporates competency-based evaluation, modular learning trajectories, technologically driven customization and decentralized accreditation.

Keywords: Skills-Centric Education, Competency-Based Learning, Future Workforce Readiness, Education Policy Reform (India 2047), Lifelong Learning Ecosystems, Employability and Human Capital Development

1.Introduction**1.1 Background**

India's education system, marked by rapid expansion with chronic concerns over quality, is undergoing a significant shift due to factors such as globalization, automation, and an emerging knowledge economy that demands versatile, interdisciplinary skills. Existing degree frameworks are rigid, often not reflecting employment market's dynamic skill needs (U21 Ranking 2023).

1.2 Significance

By 2047, India will have the world's largest working-age population. Realizing this advantage necessitates aligning educational outcomes with occupational expectations, making skills-centered educational frameworks essential in fostering employability, personal development and national growth.

1.3 Questions to be addressed

What are the systemic constraints to shifting from degree to skill orientation in Indian education system?

What are the changes required in policy design, accreditation and pedagogy for aligning national strategic goals for 2047, with better education outcomes, in terms of equity, employability and economic growth?

2 Literature review**2.1 Theoretical foundations of education and skills**

- Human Capital Theory (Becker, 1964): Education improves human capital, and hence productivity; but the traditional models overemphasize credential prestige.
- Capability Approach (Sen, 1999): The focus moves from what individuals do (to what they are empowered to do), skills development is crucial for autonomy.
- 21st-Century Skills Frameworks: Critical thinking, collaboration, digital literacy, adaptability.

2.2 The mismatch in Indian education and labour market

- Several studies (NITI Aayog, 2020; All India Council for Technical Education Reports) point to mismatches in the education system, with degrees being disconnected from the actual functional skills required by the employers.

2.3 International case studies

SkillsFuture Initiative in Singapore: Credit for lifelong learning; competency-based credit design.

European Credit Transfer System: Transnational recognition of learning units; modular design.

Design and Governance of National Skills Education Policy for 2047

3. Research Methods : In this research, we use both qualitative and quantitative methods:

3.1 Quantitative Methods

We look at big national datasets to understand:

How many graduates have jobs, what skills they have.

We use math to see how different certificates relate to jobs and money.

3.2 Qualitative Methods

We talk to people: leaders and teachers in the government, schools, industry leaders, and people who train workers.

We work with students of different ages and incomes to learn more.

3.3 Building an Idea of Change

We use data to figure out what experts expect for 2047.

4. A New Way to Learn: Focus on Skills**4.1 The way it works:**

We focus on abilities, not just certificates.

Each student learns different things.

Learning can be changed for each student.

Tests are not just one big test at the end.

We look at little certificates for each skill.

4.2 How it works:

We look at what each student knows.

AI picks what matters for a student.

We can see what small certificates a student has.

5. Making it Happen: Policy and Government**5.1 A National Skills Education Policy 2047**

We value all certificates the same.

We value results, not number of students.

5.2 A new way for universities & colleges

Universities & colleges are not about certificates.

5.3 Joint work between schools and the real world

Industry and colleges work together to make their curriculum.

6. Implementation Methods**6.1 Changing the Curriculum**

Change to project-based, integrated curriculum that mixes AI, data, and sustainability.

6.2 Building Skills

Train teachers on how to teach well-thought-of skills.

6.3 Technology Support

Spend money on digital tools that everyone can use to help with:

Virtual science labs

Testing skills

Learning that matches each person

7. Expected Problems**7.1 Fairness**

Some people might not have technology, unless rules make sure that everyone can get new ways of learning, especially people in faraway places in India.

7.2 Making Sure it is Good

Make sure new tests are trustworthy when they aren't run by the school.

7.3 Not Wanting to Change

Some schools might not want to change from the old way of teaching.

8. Predicted Good Results (in 2047)**8.1 Helping the Economy**

It is easier for people to get jobs.

More people in India make new things.

There are fewer people who don't have jobs because they don't know the right skills.

8.2 Helping People

People can learn more on their own.

People from all groups can learn in ways that work for them.

9. Talk About the Problem

Moving from thinking degrees are most important to skills is a big step. A lot will have to change in the rules, how we teach, how we test and how we use technology. The new way of learning will put the student first, match what people learn to what jobs need, and keep the economy strong even when things change.

10. Conclusion

By 2047, the way people learn in India will measure success by more than just a diploma. Real skills, being able to learn new things, and learning over a lifetime will show what someone can do. This new way of teaching matches how the world is changing and what India wants for its people.

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Agro-Tourism and Its Role in Achieving the Vision of Viksit Bharat 2047**1) Mr. Sandip Anandrao Patugade**

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Abstract

Agro-tourism has emerged as a sustainable rural development strategy capable of diversifying rural livelihoods, promoting cultural heritage, and strengthening agricultural ecosystems. In the context of India's developmental goal—Viksit Bharat 2047—agro-tourism bridges economic, social, and environmental dimensions of development. This paper analyses the evolution, benefits, challenges, and policy frameworks of agro-tourism in India and explores its potential contribution to rural viability, environmental sustainability, and inclusive growth. The research synthesizes literature on agro-tourism models, empirical studies from Indian states, and global best practices. Policy implications for enhancing India's agro-tourism ecosystem are also highlighted.

(Keywords: Agro-tourism, rural development, sustainable tourism, India, Viksit Bharat: 2047)

1. Introduction

Agro-tourism refers to the integration of agricultural environments with tourism activities where visitors participate in farm-based activities, experience rural lifestyles, and engage with agricultural processes. It is recognized globally as a sub-sector that fosters rural development by supporting farmer incomes, preserving cultural heritage, and creating community-based tourism enterprises (Sarkar, 2010; Mahida, 2023). India, with its vast agrarian landscape and rich cultural diversity, is uniquely positioned to leverage agro-tourism to support Viksit Bharat 2047, a long-term vision emphasizing inclusive, sustainable, and equitable growth.

2. Literature Review**2.1 Agro-Tourism as Rural Development Strategy**

Several studies underscore agro-tourism's potential to contribute to rural economic diversification. Agro-tourism provides additional income streams for farmers, reduces rural-urban disparity, and creates employment opportunities (Sarkar, 2010; Mahida, 2023). Agro-tourism can also foster cultural exchange by showcasing rural traditions, cuisine, and folklore to urban tourists (Business APAC, 2023).

2.2 Economic and Social Benefits

Agro-tourism has been linked to economic resilience in rural settings. It increases demand for local produce and services, boosts rural entrepreneurship, and encourages value addition to agricultural products (Murthy, 2014; Pradhan et al., 2025). Furthermore, it enhances rural employment, particularly for women and youth, and supports community empowerment (Odisha model, 2025).

2.3 Sustainability and Environmental Awareness

Agro-tourism not only celebrates agriculture but also encourages sustainable farming practices such as organic cultivation, sustainable water use, and biodiversity conservation (Sharanya Yadav, 2024;

Business APAC, 2023). Beyond economic benefits, agro-tourism activities help promote environmental stewardship among visitors.

3. Research Methodology

This research adopts a qualitative approach through literature review and synthesis of scholarly journals, case studies, policy documents, and recent empirical research findings. Studies were selected on agro-tourism frameworks, socio-economic impacts, policy environment, and sustainability factors, offering a comprehensive understanding of its role in India's development trajectory.

4. Agro-Tourism in the Indian Context

4.1 Historical Development

Agro-tourism in India has grown in response to the need for rural diversification beyond traditional agrarian activities. Initial case studies demonstrated that farm tourism enhanced farmers' income and knowledge transfer between urban and rural populations (Sarkar, 2010).

4.2 State Level Initiatives

Several Indian states, including Maharashtra, Odisha, and West Bengal, have adopted agro-tourism policies to stimulate rural economies. Maharashtra's agro-tourism policy, for instance, emphasizes environmental experiences, employment creation, and rural revitalization (Maharashtra Agro-tourism Policy, 2020). Odisha's initiatives focus on community-driven development and tourism entrepreneurship (Odisha model, 2025). Similarly, West Bengal's research highlights the financial viability of agro-tourism enterprises in boosting rural incomes (Pradhan et al., 2025).

5. Benefits of Agro-Tourism for Viksit Bharat 2047

5.1 Economic Diversification and Employment

Agro-tourism provides alternative income sources for farmers and rural entrepreneurs (Mahida, 2023). It integrates hospitality, food services, guided farm tours, and local product markets, stimulating rural economies and creating new employment opportunities.

5.2 Cultural Preservation and Exchange

Agro-tourism activities preserve cultural traditions, rituals, and agricultural heritage by integrating them into tourism experiences. This strengthens cultural identity and promotes national heritage (Business APAC, 2023).

5.3 Sustainable Rural Development

Agro-tourism can foster sustainable farming through eco-friendly practices and environmental education for visitors. This synergy supports India's commitment to sustainability under global frameworks such as the Sustainable Development Goals (UNIDO, 2025).

6. Challenges to Agro-Tourism Expansion

Despite its promise, agro-tourism faces obstacles such as inadequate infrastructure, limited marketing knowledge, seasonality of agricultural activities, and a lack of coordinated policy frameworks among agencies (Shrutiba et al., 2025; Londhe & Ishwar, 2025). Strategic investment and public-private partnerships are needed to enhance accessibility and visibility.

7. Policy Implications

To realize agro-tourism's potential within **Viksit Bharat 2047**, the following policy measures are proposed:

- Integrated Rural Tourism Frameworks linking central schemes (e.g., Swadesh Darshan) with agro-tourism routes and circuits (Government of India, 2015–2025).
- Capacity Building programs for farmers on hospitality, digital marketing, and tourism management.
- Infrastructure Development for rural connectivity, digital platforms, and inclusive amenities.
- Financial Incentives for agro-tourism startups and community enterprises.

8. Conclusion

Agro-tourism offers a multi-dimensional pathway for supporting India's developmental aspirations towards **Viksit Bharat 2047**. With its capacity to diversify rural incomes, preserve cultural heritage, and support environmental sustainability, agro-tourism is a strategic subsector of tourism that can significantly contribute to rural prosperity and national growth. Policies and investments that strengthen rural tourism ecosystems will be crucial to harness this potential fully.

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Artificial Intelligence (Ai) Integration In Statutory Welfare Facilities Under The Factories Act, 1948: A Legal, Operational, And Technological Inquiry

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Abstract

This paper critically explores the intersection of Artificial Intelligence (AI) applications and statutory welfare facilities mandated under the Factories Act, 1948 in India. While the Act establishes a framework for worker welfare, rapid technological evolution — especially AI — presents opportunities to enhance compliance, employee well-being, and operational efficiency. Through legislative review, technological analysis, and application scenarios, this research outlines how AI can support welfare provisions, identifies legal and ethical considerations, and proposes a model for responsible AI adoption in factory welfare infrastructure.

Keywords: Artificial Intelligence, Welfare Management, AI Enabled Compliance, Factory Act 1948, IoT ecosystems

1. Introduction

One of the main goals of Indian labour law, particularly as it is expressed in the Factories Act of 1948, is the welfare of workers in industrial settings. Employers are required by the Act to provide a number of statutory welfare facilities in order to maintain a dignified, safe, and compassionate workplace. Meanwhile, industrial operations are changing due to the introduction of artificial intelligence (AI), a subset of sophisticated computational systems that can perform machine learning, predictive analytics, natural language processing, and autonomous decision support. There is, however, a dearth of research on the systematic integration of AI into India's factories' statutory welfare domains. This study looks at legal requirements and related technological frameworks in an effort to close that gap.

2. Statutory Welfare Under the Factories Act, 1948

2.1 Welfare Provisions: Legal Framework

In order to promote worker well-being, the Factories Act of 1948, specifically Sections 42–50, establishes mandatory welfare amenities:

- **Washing facilities:** Sufficient and appropriate spaces for employees to wash, with facilities designated for each gender when necessary.
- **Clothing storage and drying:** Area for employees' everyday attire and damp equipment. Appropriate seating for employees who must stand.
- **First-aid equipment:** First-aid rooms or boxes that are easily accessible and fully furnished.
- **Canteens:** Establishing canteens in factories employing at least 250 people.
- **Shelters and rest areas:** Rest areas and lunch rooms for businesses with more employees than a certain threshold.
- When a certain number of women employees are employed, **creches** are places to care for their children.
- **Welfare officers:** In larger organizations, they must be appointed.
- Thus, the Act establishes the statutory welfare infrastructure for workers by establishing a baseline of physical space, amenities, and human oversight. It is important to remember that under Indian law, compliance is quantifiable, explicit, and legally enforceable.

3. Artificial Intelligence: Definitions and Role in Workplaces**3.1 AI in Industrial Context**

Artificial intelligence refers to systems that are able to carry out tasks like pattern recognition, prediction, and autonomous action that normally require human intelligence. AI is increasingly supporting the following in industrial settings: predictive analytics to foresee equipment malfunctions. computer vision to identify risks and examine human behaviour. Decision-support tools for safety supervision and compliance. The foundation of Industry 4.0 paradigms, such as ubiquitous IoT ecosystems and smart factories, is artificial intelligence.

4. Aligning AI with Welfare Objectives**4.1 Enhancing Hygiene and Sanitation Facilities**

To guarantee cleanliness and proper resource provisioning, AI-enabled environment sensors and facility usage analytics can be used to supplement mandated washing and sanitation facilities. For instance:

- Water levels, cleanliness indicators, and usage patterns can all be tracked by IoT sensors.
- AI forecasting can optimize maintenance schedules by predicting peak usage.
- This type of data-driven welfare management guarantees that the real quality of services is in line with legal requirements.

4.2 First Aid and Emergency Response

- AI-assisted emergency response systems can bring about a revolution in first-aid compliance:
- AI-assisted wearable devices identify irregular vital signs and automatically notify emergency services.
- Computer vision in first-aid rooms can track equipment levels and notify management when they are low.
- These systems meet the Act's requirement for accessible first-aid infrastructure because they promote preparedness and responsiveness.

4.3 Canteen and Nutrition Management

Canteens, which are a necessity in larger factories, can make use of AI for optimization: AI-based menu planning according to nutritional requirements and preferences. Predictive inventory management to avoid wastage and ensure cleanliness. This not only increases adherence but also enhances worker nutrition and satisfaction.

4.4 Rest Rooms, Shelters, and Welfare Officers

AI can benefit welfare officers, who are a legal requirement in large factories, in the following ways: Analysis of employee sentiment using natural language processing AI tools. Incident reporting systems that can track patterns in welfare complaints. Predictive workload analytics for rest room attendance and crowd management. These use cases make it easier for welfare officers to be proactive rather than reactive.

5. Legal and Ethical Issues of AI Implementation

Although AI holds promises of improved functionality and well-being, it also raises important legal and ethical issues:

5.1 Privacy and Data Protection

AI tools such as computer vision and biometric surveillance must obtain worker consent, ensure safe data management, and be transparent to prevent privacy infringement, particularly in the context of emerging data protection regulations in India.

5.2 Bias and Fairness

If the data used to train AI is biased, the AI system may produce differential outcomes, which will affect the principle of equal welfare for all workers.

5.3 Regulatory Oversight

Indian labour law does not regulate AI; therefore, it is important to set standards for the implementation of ethical AI in the welfare context.

6. A Conceptual Model for AI-Enabled Welfare Compliance

We suggest a modular and AI-enabled welfare compliance system with essential elements:

1. Data Layer: Anonymized workplace and facility usage data collection.
2. Analytics Layer: AI models for predicting welfare requirements and compliance deficits.
3. Action Layer: Automated alerts, welfare officer dashboards, and compliance reports.
4. Governance Layer: Ethical foundations, worker consent tools, and legal compliance records.

Our conceptual model maintains the spirit of the law while leveraging AI capabilities for enhanced proactive welfare provision.

7. Discussion

The integration of AI into welfare infrastructure does not displace statutory requirements but rather improves the manner in which compliance is achieved in a data-driven world. For example, AI can be used to:

- Quantify the usage of welfare facilities.
- Predict and prevent non-compliance.
- Enable positive health outcomes for workers through personalization and anticipatory analytics.

However, this should be done in a manner that is balanced with concerns for worker privacy, consent, and fairness.

8. Conclusion and Future Directions

This study shows that AI can be an effective means to support, monitor, and enhance the statutory welfare facilities required by the Factories Act, 1948, in Indian factories. However, it also poses some legal, ethical, and practical issues that need to be addressed from an interdisciplinary perspective.

Future research should focus on:

- Pilot studies of AI welfare infrastructure in Indian factories.
- The regulatory framework for AI management in industrial welfare.
- Impact studies from a worker-centric perspective to evaluate the effects of AI integration.
- By focusing on human dignity, the law, and innovation, India can create a model of welfare that is both legal and cutting-edge.

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A Study on Customer Perception towards E-Banking Services in Vikshit BharatKeerti Reddy¹Dr Basavaraj S Kudachimath²**Abstract**

In the context of Vikshit Bharat, this study looks at how customers view e-banking services, with an emphasis on figuring out what influences adoption and sustained use. A qualitative research design based on interpretivist philosophy is used in this work to create insights from empirical research on digital banking in India conducted after 2020.

The investigation shows that because of growing smartphone adoption, the development of digital infrastructure and encouraging government actions, consumer impression of e-banking services is usually good and getting better. Perceived utility, simplicity of use, trust, security and service quality are important factors that affect positive perception. Issues like cybersecurity worries, fraud apprehension, low digital literacy and infrastructure deficiencies still prevent broader use, especially in developing and transitional areas. To achieve equitable and sustainable financial inclusion, the report emphasises the necessity of improved digital literacy initiatives, user-centric digital banking techniques and fortified cybersecurity frameworks. Policymakers and financial organisations can use the data to better align digital banking initiatives with the wider goals of the Vikshit Bharat agenda.

Keywords: E-Banking, Customer Perception, Vikshit Bharat, Digital Financial Inclusion, Technology Adoption

Introduction

Under the Vikshit Bharat goal, e-banking has become a crucial tool for bringing formal financial services to developing and transitioning areas in the age of rapid digital transformation. Customers' perceptions of digital banking initiatives, which include trust, usability, security and accessibility, are crucial to their success. This study seeks to critically examine how consumers in Vikshit Bharat perceive e-banking services and the factors shaping their acceptance and sustained usage.

The process of conducting financial transactions has been profoundly changed by the digitalisation of banking services, which has made them more convenient, efficient and economical. E-banking platforms are becoming more widely used in rural and semi-urban areas due to government programs like Digital India, Jan Dhan Yojana and Unified Payments Interface (UPI). Disparities in digital literacy, infrastructure accessibility and trust in electronic banking systems still exist despite these developments. Customers' opinions and readiness to use e-banking services are directly impacted by these difficulties.

Designing inclusive and user-centric banking solutions that support Vikshit Bharat's goals thus requires an understanding of customer perception. This study aims to analyse key determinants such as perceived usefulness, ease of use, security concerns, and service quality that influence customer behaviour towards e-banking. By identifying these factors, the research intends to provide valuable insights for policymakers, financial institutions, and technology providers to strengthen digital banking adoption and promote sustainable financial inclusion in emerging regions of India.

Theoretical background

The investigation of Vikshit Bharat's customers' perceptions of e-banking services was directed and informed by a number of theoretical frameworks. Davis (1989) developed the Technology Acceptance Model (TAM), which was used to describe how customers' attitudes and intentions to use e-banking services were impacted by perceived utility and perceived ease of use. The Theory of Planned Behaviour (TPB) developed by Ajzen (1991) further supported the study by emphasising the role of subjective norms and perceived behavioural control in shaping customer acceptance of digital banking. Rogers' Diffusion of

Innovation Theory (2003) was also relevant in understanding how innovation characteristics such as relative advantage, compatibility, and complexity affected the spread of e-banking among consumers in underdeveloped regions. Additionally, Perceived Risk Theory highlighted the impact of security, privacy, and trust concerns on customer perception and usage behaviour (Featherman & Pavlou, 2003). Together, these theories provided a comprehensive conceptual foundation for examining how technological, psychological, and social factors influenced customer perception and adoption of e-banking services within the Vikshit Bharat framework.

Literature review

Recent post-2020 empirical research indicates that customer perception toward e-banking services in India, aligned with the vision of Vikshit Bharat, is generally positive and steadily strengthening, driven by improvements in digital infrastructure, fintech innovation, and increased smartphone penetration. Perceived utility and simplicity of use considerably increase positive customer attitudes about digital banking systems, according to studies based on the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Shankar & Datta, 2020).

Raza et al. (2020) found that service quality dimensions, including efficiency, privacy, and system availability, positively influence customer perception and satisfaction in e-banking contexts. Gupta and Singh (2022) further proved that customer pleasure is greatly influenced by responsiveness, personalisation, and dependability, all of which enhance general perception and loyalty. All of these results point to a generally fairly high to high level of customer perception for e-banking services in India, especially among urban and digitally aware populations.

Trust, perceived security, service quality and digital literacy are repeatedly cited in recent research as the main predictors of adoption. Adoption intentions are highly predicted by perceived security and institutional trust, but customer attitudes are adversely affected by perceived risk, according to Kaur and Arora (2021). Patel and Patel (2022) found that customers' behavioural intentions to use online banking services are greatly influenced by social influence, enabling circumstances and technological awareness. Sahu and Singh (2021) found that the COVID-19 pandemic increased the perceived utility and necessity of digital banking, which sped up its acceptance and led to long-lasting post-pandemic usage patterns. Sharma et al. (2023) emphasised that system quality and effective customer support mechanisms further strengthen adoption and continued usage intentions. Collectively, these studies indicate that adoption in the Indian context is multifaceted, influenced by technological, psychological, and socio-demographic factors.

Despite overall positive perceptions and increasing adoption, customers continue to face several challenges in using e-banking services. Perceived cybersecurity threats, fear of fraud, and concerns about data privacy remain prominent barriers (Kaur & Arora, 2021). Rural–urban disparities also persist, with limited digital literacy and inadequate technological infrastructure constraining adoption in rural areas (Patel & Patel, 2022). Additionally, Raza et al. (2020) identified service interruptions and technical glitches as factors negatively affecting customer trust and satisfaction. Older customers, in particular, report higher levels of technological anxiety and perceived complexity, which reduce usage confidence (Shankar & Datta, 2020). Therefore, while India's digital banking ecosystem reflects substantial progress consistent with the goals of Vikshit Bharat, addressing security concerns, enhancing digital literacy, and improving service reliability remain critical to ensuring inclusive and sustained positive customer perception.

Gap of the study

Most existing studies on e-banking focus on urban and developed regions, with limited attention given to customer perception in underdeveloped and transitioning areas under the Vikshit Bharat vision. Prior research mainly emphasises technological and policy aspects, while factors such as trust, security, usability, and accessibility from the customer perspective remain underexplored. Moreover, region-specific challenges related to digital literacy and infrastructure are often overlooked. This study addresses this gap by providing an empirical analysis of customer perception towards e-banking services in Vikshit Bharat to support inclusive digital banking strategies.

Scope of the study

The scope of this study is limited to analysing customer perception towards e-banking services in selected regions under the Vikshit Bharat framework. It focuses on key factors such as trust, security, usability, and accessibility influencing the adoption of e-banking services. The study covers customers using digital banking platforms like mobile banking, internet banking, and UPI services and examines the influence of demographic variables on usage behaviour. The findings aim to support banks and policymakers in strengthening digital banking adoption and financial inclusion in these regions.

Objectives

- To analyse the factors influencing customer satisfaction towards e-banking services in Vikshit Bharat.
- To identify the key factors influencing the adoption of e-banking services.
- To examine the challenges faced by customers in using e-banking services.
- Analysis of Growth of E-Banking in India

Methodology

Research Design : This study adopted a qualitative research design to explore and synthesise existing knowledge on customer perception towards e-banking services in the context of Vikshit Bharat. A qualitative design was appropriate as it enabled an in-depth understanding of perceptions, attitudes, and challenges reported in prior empirical studies.

Research Approach : An inductive research approach was employed to derive insights and themes from existing literature rather than testing predetermined hypotheses. This approach facilitated the identification of emerging patterns related to customer perception, adoption factors, and challenges in e-banking usage.

Research Philosophy : The study was grounded in an interpretivist research philosophy, which focuses on understanding social phenomena through meanings and interpretations constructed by individuals and reflected in scholarly research.

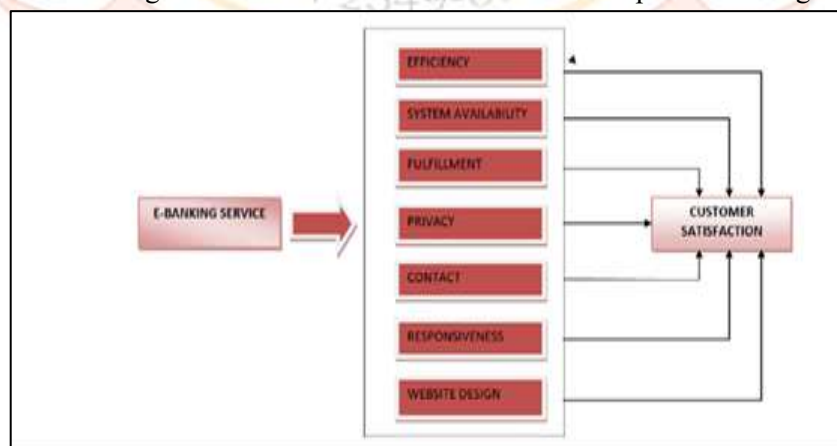
Data Collection Method : Data were collected through a systematic literature review of secondary sources, including peer-reviewed journal articles, conference papers and policy reports published after 2020. Academic databases such as Google Scholar, Scopus and Web of Science were used with keywords including “e-banking”, “customer perception”, “digital banking” and “Vikshit Bharat”. Only empirical studies related to the Indian context were selected for analysis.

Data Analysis

The collected data were analysed using thematic analysis. Findings from selected studies were coded and categorised into key themes such as customer perception, factors influencing adoption and challenges in e-banking usage. In order to facilitate a systematic interpretation of the literature.

a. Analysis of key factors influencing customer satisfaction in e-banking in India

Figure 1: Customer Satisfaction Relationship in e-Banking

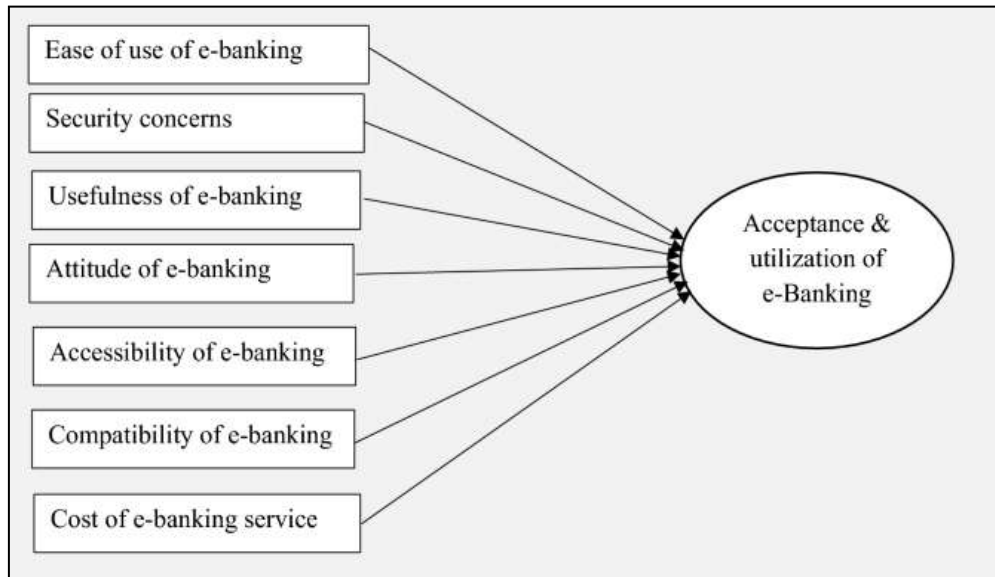


Source: Faruqui, R. (2017). Impact of internet banking service quality on customer satisfaction. *The Journal of Internet Banking and Commerce*, 22(1), 1–17.

By the analysis of above figure it can be noted that mainly there are 7 major factors influence customer satisfaction through e-banking services. The most important factor is efficiency, privacy, safety of funds and customer friendly website play a pivotal role.

b. Analysis of key factors influencing the adoption of E- Banking services in India :

Fig-2 Factors governing adoption of E-Banking in India



Source: Ayinaddis, S. G., Mirete, T. G., & Getahun, B. W. (2025). Evaluating the factors influencing electronic banking adoption in Ethiopia: Analysis from customer perspective. *Journal of Innovation and Entrepreneurship*, 14, Article 56. <https://doi.org/10.1186/s13731-025-00485-w>

By the analysis of above diagram it is clear that acceptance and utilization of E-Banking which is nothing but adoption of E Banking services is largely influenced by 7 important factors. The most among them is ease of using e banking portals and security concerns. By correlating the above diagram No-1 and Diagram -2 There are common factors in E banking adoption and customer satisfaction parameters. These common factors are convenience of use of E-Banking design and safety.

c. Analysis of challenges faced by E-Banking system in India.



Source: <https://www.quantzig.com/blog/challenges-online-banking-sector/>

Figure 3: Growth of online banking users in India



Figure 4: Challenges faced by customers in e-banking services

Findings

- Thematic analysis of selected studies identified customer perceptions, adoption factors, and e-banking challenges as core themes, enabling systematic literature interpretation (Figures 1–4).
- Figure 1 reveals a strong positive correlation between service quality and customer satisfaction in e-banking, driven by reliability and responsiveness.
- Key adoption influencers (Figure 2) include trust, perceived security, ease of use, and infrastructure, with cybersecurity emerging as pivotal amid rising digital threats.
- Despite user growth (Figure 3), challenges persist (Figure 4), notably cybersecurity vulnerabilities, usability barriers, and connectivity issues in Indian nationalised banks.

Conclusion

This study comes to the conclusion that a complex interplay of socioeconomic, psychological and technological elements affects how customers in Vikshit Bharat perceive e-banking services. Digital banking initiatives have greatly improved financial accessibility and convenience; their long-term viability hinges on enhancing user-friendly service design, guaranteeing system dependability and fostering confidence.

The findings show that to encourage broader adoption and continued use of e-banking services, it is imperative to strengthen cybersecurity measures, support digital literacy programs, and provide timely customer service. By addressing these concerns, governments and financial institutions may accelerate inclusive digital transformation and align banking services with the broader objectives of the Vikshit Bharat agenda.

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Role of E-Commerce in Present Era**Dr.Vinod Hanumant Awaghade****Designation-** Associate Professor

Department of Commerce ,Yashwantrao Chavan Mahavidyalaya, Pachwad.

Affiliated University- Shivaji University Kolhapur.**State-**MaharashtraEmail-vinodawaghade86@gmail.com**Abstract-**

Currently, the commercial sector is considered very important. The role of the commercial sector is considered very important to survive in global competition. The global journey from the barter era to the digital revolution is evident. The increased use of debit cards and credit cards is proving beneficial for transactions. The use of many new systems like Google Pay, Phone Pay, BHIM application by many consumers is increasing. The increasing use of e-commerce is witnessing a huge change in the global market. The impact of e-commerce is increasing in the import, export and manufacturing sectors.

Introduction:

The role of commerce is very important in privatization, globalization and modernization. The winds of tremendous change are blowing in the commerce sector. E-commerce is playing a very important role in surviving in the global competition. In fact, it is seen that e-commerce has created a good economic situation. The increasing use of online applications by customers in the banking sector has increased. In the commercial sector, many types of opportunities are currently being created.

Objectives of the Study:

1. To study the concept of e-Commerce.
2. To study the challenges of e-Commerce.
3. To study the opportunities of e-Commerce.
4. To give proper Suggestion.

Significance of the study:

New education policy is very useful in the current situation students can benefit from the new education policy in a good way. Students have to acquire skills to achieve all the marks. More opportunities in commerce stream are under the new education policy. Many branches like Bank Insurance Marketing Advertising Financial Structure Messaging are working under Commerce branch. Commerce education is becoming the need of the hour. A look at the future scenario shows that the commerce branch will be very useful.

Keywords- e-commerce, e-Marketing, NEP etc.

Research Methodology-

The present study is based on secondary source of data. Secondary data is collected through various books, Journals, Websites and Internet. For the collection of primary data the researcher has paid visit to market committees (Secretary), farmers and agents .It is after having detailed discussion the present data is collected.

Data collection:**1. Primary Data:**

For the collection of primary data the researcher has paid visit to market committees (Secretary), farmers and agent's .It is after having detailed discussion the present data is collected.

2. Secondary Data: The secondary data is derived from the following sources:

1. Books 2. Magazines 3. Journals 4. News paper

Concept of E-commerce

E-Commerce is a way of doing business transactions via the internet. E-commerce or e-business is based on the electronic processing and transmission of data, including text, sound, and video. E-commerce as it is commonly known is the use of technology to conduct financial transactions online.

Challenges of e-Commerce.:

- 1. Growing competition. :** Currently, competition in the commercial sector is increasing. Consumers, manufacturers, representatives and retailers are increasingly using new technologies.
- 2. Increased customer expectations :** Customers expect different service facilities. Customers want to get maximum goods at minimum price. It has become very important to focus on providing quality service to maintain the customer base.
- 3. Insufficient customer engagement :** In a competitive environment, manufacturers are currently faced with the challenge of gaining maximum customers. Sellers are faced with the challenge of attracting customers to buy.
- 4. Complicated process of product return & refund:** Most sales are made through online processes. In online processes, returning items is more complicated than buying and selling. If there is a defect in the product, or if the customer does not like the product, the process of returning the product can be complicated.
- 5. Limited scalability options :** To get maximum customers, first of all, skilled service facilities are needed. Without focusing on service facilities in qualitative and quantitative terms, financial benefits will not be achieved. This has created a need for experienced and skilled employees along with technology.

Opportunities in e-Commerce :

- 1. Global Trade Opportunities:** E-commerce has created a huge opportunity at the global level. Along with the manufacturing sector, e-commerce is being used to operate in the import and export trade sector. E-commerce is currently proving effective in gaining advantage in the competitive era.
- 2. Virtual Businesses:** Business firms now have the ability to become virtual E-Business. Virtual business uses electronic means to transact business as opposed to the traditional means of face to face transaction.
- 3. Lower search costs:** The Internet brings low search costs and high price lucidity. E-business has proved to be highly cost effective for business concerns as it cuts down the cost of marketing, processing, inventory management, customer care, etc.
- 4. Round the clock:** Customers can do transactions for the product or enquiry about any product/services provided by a company anytime, anywhere from any location.
- 5. Payment mode:** Cash on delivery is the preferred payment mode. Low credit card access and low trust in online transactions has led to cash on delivery being the preferred payment choice in India. Unlike electronic payments, manual cash collection is painstaking, risky, and expensive.

Conclusion :

There is no one commonly agreed definition of ECommerce. E-commerce has an impact on three major stakeholders, namely society, organizations and customers. There are a number of advantages, which include cost savings, increased efficiency, customization and global marketplaces. There are also limitations arising from ECommerce which apply to each of the stakeholders. These include information overload, reliability and security issues, and cost of access, social divisions and difficulties in policing the Internet. In order to aid general understanding of E-Commerce a number of frameworks have been introduced to explore

it from different perspectives. These frameworks help identify the elements of E-Commerce and how businesses can better understand E-Commerce and its practical applicability.

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A Critical Analysis of Challenges Faced by Agro-Food Processing Units in Accessing Government Subsidies in Satara District

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Abstract

Agro-food processing units are important for India's economy because they increase the value of farm produce, create employment, and support farmers' income. To promote this sector, various government subsidy schemes have been introduced at the central and state level. The present study examines the challenges faced by agro-food processing units in availing government subsidies in Satara District, Maharashtra. The study relies on first-hand data gathered from 50 agro-food processing units using a well-structured questionnaire incorporating a five-level Likert scale was used, supported by secondary data from policy documents and published literature. Data interpretation was carried out through mean score analysis along with percentage analysis. The study concludes that administrative and procedural inefficiencies, rather than inadequacy of financial support, are the primary barriers to subsidy utilization. The paper suggests simplification of procedures, improved transparency, and better communication mechanisms to enhance the effectiveness of government subsidy schemes.

Keywords: Agro-Food Processing Industry, Government Subsidies, Challenges, Satara District, Awareness

Introduction

The agro-food processing industry occupies a crucial position in the Indian economy as it contributes significantly to value addition of agricultural produce, employment generation, and rural development. The Government of India and state governments have introduced various subsidy schemes, incentives, and financial support to boost the faster growth of this units.

Satara District, operating in the western region of Maharashtra, has a strong agricultural base including the creation of yields such as sugarcane, pulses, cereals, fresh vegetables and fruits. This provides considerable scope for faster upgradation of agri-food processing units activities across the district. To encourage entrepreneurs and small-scale processors, several government subsidies related to capital investment, technology upgradation, infrastructure development, and working capital support are made available.

However, despite the availability of these schemes, many agro-food processing units in Satara District face significant challenges in availing government subsidies. In this context, the present study attempts to empirically analyse the challenges faced by the agro-food processing industry in availing government subsidies in Satara District and to suggest measures for improving the effectiveness of subsidy implementation.

Food Processing Industry Scenario in Maharashtra

Maharashtra has historically been one of the most industrialized states in India and continues to attract substantial domestic and foreign venture. The state's overall economic production, expressed in terms of GSDP reflects the dominance of the industry and services sectors, which together contribute a major share

to the state economy. The food processing sector in Maharashtra has emerged as a priority area due to the state's rich agricultural base and availability of raw materials.

The Government of Maharashtra has introduced various policy measures to promote food processing industries, including capital and interest subsidies, infrastructure development through mega food parks and cold chain facilities, land and utility concessions, and regulatory support such as single-window clearance systems. These initiatives aim to encourage private investment, reduce operational constraints, and enhance the competitiveness of food processing units, particularly micro and small enterprises.

Table no. 1 Major Government Support Measures for Food Processing Units in Maharashtra

Category	
Financial Incentives	Capital subsidy, interest subsidy, modernization assistance, GST benefits
Infrastructure Support	Mega Food Parks, cold chain facilities, warehousing, testing laboratories
Land & Utility Concessions	Stamp duty exemption, land concessions, water and electricity subsidies, solar power benefits
Regulatory Support	Single window clearance system, pollution control relaxations, easier licensing procedures
Market & Raw Material Support	Direct purchase of agricultural produce from farmers (APMC reforms)
Skill & Entrepreneurship Support	Skill certification subsidy, special incentives for women entrepreneurs
MSME Promotion	Priority status and additional incentives for micro and small processing units

(source: Maharashtra State Food Processing Policy (2017))

Review of literature

Previous studies highlight that government support and subsidy schemes hold a key role in promoting the improvement of the agro-food processing sector and strengthening regional economic development. Policy interventions related to capital investment, infrastructure creation, and institutional support have been found to encourage entrepreneurship and value addition in the food processing industry (Desai, 2021; Ministry of Food Processing Industries [MoFPI], 2022). Khan and Singh (2022) highlight that the Indian food processing industry continues to struggle with structural and productivity challenges, particularly due to inadequate infrastructure, lack of skilled labour, and limited access to advanced technology, which impede industrial efficiency and competitiveness.

Despite the availability of government support, several studies have identified persistent challenges faced by agro-food processing units. These challenges include infrastructural inadequacies, regulatory complexities, limited access to institutional finance, and market-related constraints, which disproportionately affect micro and small enterprises (Reddy & Bantilan, 2012; Singh et al., 2022). Studies published in Economic and Political Weekly further emphasize that structural and governance-related issues within the agricultural and agro-industrial ecosystem hinder the effective transmission of policy benefits to grassroots-level enterprises (Chand et al., 2007).

Recent research has increasingly focused on the effectiveness of subsidy schemes and implementation mechanisms. While government initiatives have contributed to capacity expansion and modernization in the food processing sector, their overall impact is often constrained by administrative inefficiencies, procedural delays, and weak communication between implementing agencies and beneficiaries (Gupta et al., 2023; Rathi, 2024). In addition, studies underline that the lack of transparency, complex documentation requirements, and limited awareness among entrepreneurs reduce the accessibility and utilization of subsidy schemes (Kathirvel et al., 2025). These studies consistently recommend simplification of procedures,

improved transparency in subsidy allocation, and stronger institutional communication frameworks to enhance the effectiveness of government support for agro-food processing units.

Research Gap:

The existing literature largely focuses on the role of government support and the overall performance of the food processing sector at the national and state levels. However, limited empirical research has been conducted on the district-level challenges faced by agro-food processing units in accessing government subsidies. There is a lack of studies examining administrative, procedural, and governance-related barriers at the micro level. The current investigation attempts to bridge this gap by providing a district-specific analysis of the challenges faced by agro-food processing units in Satara District, Maharashtra.

Research problem

Despite the introduction of various subsidy schemes and incentives by the Government of Maharashtra, agro-food processing units in Satara District experience considerable difficulties in accessing and effectively utilizing these subsidies. As a result, many units fail to fully benefit from the available support, which adversely affects the advancement and sustainability of agri-based food processing industries at the district level. Therefore, it is essential to detect and analyze the defies encountered by agri-food processing units at accessing government subsidies in Satara District.

Objective

1.To analyse the challenges faced by agro- food processing units in accessing government subsidies in Satara district.

Research Methodology

This research utilizes a descriptive and analytical approach to examine the difficulties encountered by agro-food processing units in obtaining government subsidies in Satara District, Maharashtra. Primary information was gathered from 50 agro-food processing units using a structured questionnaire and interview. Secondary information was sourced from government publications, policy reports, and previously published research works.

A stratified random sampling method was adopted to ensure representation from all 11 talukas of Satara District. As the number of units chosen from each taluka did not exactly match their population proportion, the sampling approach is categorized as disproportionate stratified sampling. The collected data were examined using descriptive statistical techniques, including percentage analysis and mean score analysis.

Internal Consistency of the Scale

The instrument's reliability was evaluated using Cronbach's Alpha, which indicated satisfactory internal consistency with a value of 0.701.

Table No. 2 Reliability Statistics

Scale	Numbers of items	Cronbach's alpha
Subsidy Access Challenge Scale	10	0.701

Table no.3 Sample Size Distribution

Sr.no	Taluka	Sample size
1	Satara	5
2	Wai	5
3	Khandala	5
4	Koregaon	5
5	Phaltan	5

6	Man	2
7	Khatav	3
8	Karad	5
9	Patan	5
10	Mahabaleshwar	5
11	Jawali	5
12	Total	50

(source of data: DIC Satara)

Analysis and Interpretation

Table no.4 Demographic Profile

Demographics	classification	Frequency	Percentage (%)
Gender	Male	38	76
	Female	12	24
	Total	50	100
Age group	Below 30 years	2	4
	31–40 Years	38	76
	41–50 Years	10	20
	Above 50 years	0	0
	Total	50	100
Education level	SSC	2	4
	HSC	19	38
	Graduation	29	58
	Post Graduation	1	2
	Total	50	100
Type of enterprise	Sole Proprietorship	48	96
	Partnership	2	4
	Total	50	100
Size of unit	micro	42	84
	Small	7	14
	Large	1	2
	Total	50	100
Year of operation	Startup Stage1-5 years	21	42
	Growth stage(6-10years)	19	38
	Established(11-15years)	6	12
	Mature (above 15years)	4	8
	Total	50	100
Location	Rural	28	56
	Urban	10	20
	Semi-urban	12	24
	Total	50	100

(Source: field data)

- The demographic distribution by gender reveals that males form the majority of the respondents (76%), while females represent 24% of the sample.

- In terms of age, most respondents (76%) mainly within the 31–40 age bracket, followed by the 41–50 bracket.
- Education: The highest proportion of respondents are graduates (58%), while the lowest proportion consists of post-graduates (2%), indicating that the sector is largely managed by graduates.
- Type of Enterprise: 96% of agro-food processing units operate as sole proprietorships, while only 4% function as partnership firms.
- Size of unit: 84% (42 units), belong to the Micro category. 14% (7 units) are Small-scale units, while only 2% (1 unit) falls under the large category.
- Year of operation: 42% (21 units) are in the Startup Stage (1–5 years), while only 8% (4 units) are Mature units (above 15 years).
- Location of unit: 56% (28 units) of the agro-food processing units are located in rural areas, while only 20% (10 units) are situated in urban areas.

Table no. 5 Challenges in Accessing Government Subsidies

Sr.no	Challenges	Mean score
1	Lack of awareness	3.08
2	Application process is too complex	3.26
3	insufficient support and guidance	3.12
4	Delay in subsidy disbursement	3.64
5	Corruption & favouritism	3.80
6	Eligibility criteria unclear	2.94
7	Lack of transparency	3.08
8	Subsidy amount inadequate	2.82
9	Unequal distribution of subsidies	2.94
10	Poor communication between government	3.82

(Source: Author's field data)

The mean score analysis shows that poor communication (Mean = 3.82) and corruption & favouritism (Mean = 3.80) are the most severe challenges in accessing government subsidies. Delay in disbursement (Mean = 3.64) is also a major issue. Other problems such as complex procedures, lack of awareness, insufficient guidance, transparency issues, and unequal distribution are moderate barriers. The inadequacy of subsidy amount (Mean = 2.82) is the least serious concern. Overall, administrative and governance issues are more problematic than financial support.

Table no.6 Frequency Distribution of Challenges Faced in Accessing Government Subsidies

Sr.no	challenges	1(Strongly Disagree)	2(Disagree)	3(Neutral)	4(Agree)	5(Strongly Agree)	Total
1	Lack of awareness	10(20%)	11(22%)	0(0%)	21(42%)	8(16%)	50
2	Application process is too complex	4(8%)	10(20%)	1(1%)	20(40%)	15(30%)	50
3	insufficient support and guidance	8(16%)	9(18%)	2(4%)	19(38%)	12(24%)	50
4	Delay in subsidy disbursement	4(22%)	10(20%)	1(2%)	20(40%)	15(30%)	50
5	Corruption & favouritism	3(6%)	7(14%)	1(2%)	25(50%)	14(28%)	50
6	Eligibility criteria unclear	11(22%)	15(30%)	0(0%)	14(28%)	10(20%)	50
7	Lack of transparency	8(16%)	16(32%)	0(0%)	16(32%)	10(20%)	50
8	Subsidy amount inadequate	11(22%)	16(32%)	0(0%)	17(34%)	6(12%)	50
9	Unequal distribution of	13(26%)	10(20%)	1(2%)	24(48%)	15(30%)	50

	subsidies						
10	Poor communication between government	3(6%)	7(14%)	1(2%)	24(48%)	15(30%)	50

(source : primary data)

The table reveals that administrative and procedural issues are the major challenges in accessing government subsidies. A large proportion of respondents reported that the application process is complex (70%) and there are delays in subsidy disbursement (70%). Serious concerns were also raised about corruption and favouritism (78%) and poor communication with government departments (78%). Moderate challenges include insufficient support and guidance (62%), lack of awareness (58%), and lack of transparency (52%). Unclear eligibility criteria (48%) affect some units. The inadequacy of the subsidy amount (46%) is considered the least serious issue.

Findings

1. The sample is largely composed of male respondents (76%). while female respondents constitute 24% of the sample
2. Poor communication with government departments and corruption/favouritism are the most severe challenges, each reported by 78% of respondents.
3. The application process is too complex and delays in subsidy disbursement are major procedural barriers, each affecting 70% of units.
4. Insufficient support and guidance is a moderate challenge reported by 62% of respondents.
5. Lack of awareness about subsidy schemes affects 58% of agro-food processing units.
6. Lack of transparency in subsidy procedures is reported by 52% of respondents.
7. Unclear eligibility criteria create difficulties for 48% of units.
8. The inadequacy of the subsidy amount is the least serious issue, affecting 46% of respondents.

Conclusion

The study concludes that agro-food processing units in Satara District face substantial challenges in accessing government subsidies, primarily due to administrative and procedural inefficiencies rather than the inadequacy of financial support. Poor communication, lack of transparency, corruption, and delays in subsidy disbursement significantly affect the ability of units to benefit from government schemes. Since the majority of units are micro, rural-based, and relatively young, these challenges are further intensified. Therefore, improving transparency, simplifying procedures, and strengthening communication mechanisms are essential to enhance the effectiveness of government subsidy schemes for agro-food processing units.

Suggestions

The government should simplify application procedures and reduce documentation requirements to make subsidy schemes more accessible. Awareness and capacity-building programs should be organized to improve knowledge about subsidy schemes and application processes. Introducing transparent digital tracking systems can help beneficiaries monitor the status of their applications and reduce delays. Strengthening communication channels between government agencies and agro-food processing units will further enhance trust and effective utilization of subsidies.

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Gender Justice in India's Vision of Viksit Bharat 2047

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Abstract

The vision of Viksit Bharat 2047 reflects India's aspiration to become a fully developed, inclusive, and equitable nation by the completion of 100 years of independence. Among the key pillars supporting this vision, gender justice holds a critical position, as no nation can achieve holistic development without ensuring equality, dignity, and opportunities for all genders. Gender justice goes beyond legal equality and focuses on fairness in social, economic, political, and cultural spheres. This research paper examines gender justice as a foundational pillar of Viksit Bharat 2047. It analyses the conceptual understanding of gender justice, evaluates the present status of gender equality in India, reviews policy initiatives, identifies persistent challenges, and suggests strategic pathways for the future. Using a qualitative and analytical approach, the study argues that gender justice is not merely a social concern but a developmental necessity that directly contributes to economic growth, democratic governance, and social sustainability. The paper concludes that achieving gender justice by 2047 is essential for realizing the broader goals of Viksit Bharat.

Keywords: Viksit Bharat 2047, Gender Justice, Inclusive Development, Women Empowerment, Social Equality, etc.

Introduction

India's development path since independence has witnessed significant progress in economic growth, democratic governance, scientific advancement, and global engagement. However, persistent gender disparities continue to challenge the country's aspiration to become a developed nation. The national vision of Viksit Bharat 2047 emphasizes inclusive growth, social justice, and sustainable development. Gender justice is central to this vision because development that excludes or marginalizes women and other genders remains incomplete and unequal.

Gender justice involves creating conditions in which individuals of all genders can exercise their rights, access opportunities, and participate equally in decision-making processes. In the Indian context, historical patriarchy, socio-cultural traditions, and structural inequalities have limited women's access to education, employment, healthcare, and leadership. Addressing these inequalities is essential for achieving the goals of Viksit Bharat 2047. This paper explores gender justice as a critical pillar of national development and highlights its role in shaping a progressive and inclusive India.

Conceptual Understanding of Gender Justice

Gender justice refers to the principle of fairness and equity in the distribution of rights, responsibilities, and opportunities among different genders. It recognizes that men, women, and gender minorities experience society differently due to biological, social, and cultural factors. Therefore, achieving justice requires not only equal treatment but also corrective measures to address historical and structural disadvantages.

In India, the foundation of gender justice is embedded in the Constitution, which guarantees equality before the law, prohibits discrimination on the grounds of sex, and empowers the state to adopt affirmative action measures for women. Gender justice encompasses legal equality, economic participation, political representation, access to education and healthcare, and freedom from violence and discrimination. Within the framework of Viksit Bharat 2047, gender justice must be understood as both a constitutional obligation and a strategic component of national development.

Gender Justice and Sustainable National Development

Gender justice plays a crucial role in promoting sustainable development. Empirical studies across the world demonstrate that countries with higher levels of gender equality achieve better outcomes in education, health, economic growth, and governance. In India, women constitute nearly half of the population, and their full participation in the development process can significantly enhance national productivity.

Educated and economically independent women contribute to improved family health, better educational outcomes for children, and stronger human capital formation. Women's participation in the workforce increases household income and supports poverty reduction. Moreover, inclusive governance that involves women in leadership positions leads to more transparent, accountable, and responsive institutions. Therefore, gender justice is not a peripheral issue but a core driver of Viksit Bharat 2047.

Present Status of Gender Justice in India

Despite constitutional safeguards and policy interventions, gender inequality remains a significant concern in India. While female literacy rates have improved substantially over the decades, disparities persist across regions, social groups, and levels of education. Girls' participation declines at the secondary and higher education levels due to factors such as poverty, early marriage, domestic responsibilities, and safety concerns.

In the economic sphere, women's labour force participation in India remains relatively low compared to global standards. A large proportion of women are engaged in unpaid care work or informal employment without job security or social protection. Wage gaps, limited access to productive assets, and restricted career advancement opportunities further reinforce economic inequality.

Health indicators also reveal gender-based disparities. Issues such as maternal mortality, anemia, malnutrition, and limited access to reproductive healthcare continue to affect women disproportionately. Gender-based violence, including domestic violence, sexual harassment, and cybercrime, poses a serious threat to women's safety and dignity. Although women's political representation has improved at the local level through reservations in Panchayati Raj Institutions, their participation in higher legislative and executive bodies remains limited.

Policy Initiatives and Legal Framework for Gender Justice

The Indian state has introduced several constitutional provisions, laws, and welfare schemes to promote gender justice. Legal measures such as equal remuneration laws, maternity benefit provisions, protection against domestic violence, and laws addressing workplace harassment reflect a commitment to gender equality. Government initiatives focusing on girls' education, women's health, financial inclusion, and entrepreneurship have contributed to positive change.

Programs promoting women's self-help groups, skill development, and digital literacy have enhanced women's economic participation and social empowerment. Political initiatives, including reservations for women in local governance, have strengthened grassroots leadership and democratic participation. These efforts align with the broader objectives of Viksit Bharat 2047 by promoting inclusive and participatory development.

However, challenges related to implementation, awareness, and enforcement persist. Legal provisions often fail to translate into real empowerment due to administrative inefficiencies and socio-cultural resistance. Strengthening institutional mechanisms is therefore essential to ensure effective outcomes.

Role of Education and Skill Development

Education is one of the most powerful instruments for achieving gender justice. Access to quality education equips women with knowledge, confidence, and skills necessary for social and economic participation. Gender-sensitive education policies are crucial for preparing women to meet the demands of a rapidly changing economy.

Encouraging girls' participation in science, technology, engineering, and mathematics (STEM), reducing digital divides, and promoting lifelong learning can significantly improve women's employability. Skill development initiatives aligned with emerging sectors such as technology, renewable energy,

healthcare, and entrepreneurship can create new opportunities. Gender-inclusive education also helps transform social attitudes and fosters values of equality and mutual respect.

Challenges to Achieving Gender Justice

Several structural and cultural challenges hinder the realization of gender justice in India. Deep-rooted patriarchal norms continue to influence social behaviour and limit women's choices. Economic dependency, unequal access to resources, and safety concerns further restrict women's participation in public life.

Intersectional inequalities related to caste, class, region, disability, and minority status intensify gender-based disadvantages. Institutional challenges such as inadequate gender budgeting, weak enforcement of laws, and limited availability of gender-disaggregated data also affect progress. Addressing these challenges requires a comprehensive approach that integrates legal reform, economic empowerment, and social transformation.

Gender Justice as a Pillar of Viksit Bharat 2047

For India to realize the vision of Viksit Bharat 2047, gender justice must be mainstreamed into all aspects of policy-making and development planning. Gender-responsive budgeting, inclusive infrastructure, and equitable access to technology are essential components of this process. Women should be recognized as active agents of development rather than passive recipients of welfare.

Enhancing women's leadership in politics, administration, research, and entrepreneurship is crucial for a developed India. Gender justice also requires the involvement of men and boys in challenging discriminatory norms and promoting equality. A holistic and inclusive approach to gender justice will strengthen India's democratic institutions and social cohesion.

Recommendations

To strengthen gender justice as a vital pillar of Viksit Bharat 2047, a comprehensive and coordinated approach is essential. The effective implementation of gender-related laws must be ensured through strong institutional accountability, regular monitoring, and efficient grievance redressed mechanisms. Women's economic empowerment should be promoted by improving access to quality education, skill development programs, financial credit, and secure formal employment opportunities. Education policies need to be gender-sensitive and inclusive, with special emphasis on reducing the digital divide and enhancing women's access to technology and digital literacy. Increasing women's representation in political and administrative decision-making bodies is crucial for ensuring inclusive governance and gender-responsive policymaking. Gender-based violence must be addressed through preventive measures, robust legal support systems, and accessible rehabilitation and counselling services for survivors. Furthermore, sustained social awareness initiatives and active community engagement are necessary to challenge patriarchal mind sets, transform social attitudes, and promote a culture of equality and respect, thereby contributing significantly to the realization of Viksit Bharat 2047.

Conclusion

Gender justice is a foundational pillar of Viksit Bharat 2047 and a prerequisite for achieving inclusive and sustainable development. While India has made notable progress through constitutional provisions and policy initiatives, significant gaps remain between policy intent and lived realities. Bridging these gaps requires sustained political will, effective institutions, and active societal participation.

By placing gender justice at the centre of its development agenda, India can unlock the full potential of its human capital and build a more equitable, resilient, and prosperous nation. Achieving gender justice by 2047 will not only fulfill constitutional ideals but also define the true success of Viksit Bharat.

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**Analysis of Marketing Strategies of Food Processing Units in Satara district:
A Balanced Scorecard Approach
(A study with special reference in Wai, Khandala, Jaoli Tehsil)**

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Abstract: -

Food processing units are facilities that convert raw agricultural, livestock, or marine materials into intermediate or final food products through cleaning, sorting, packing, and processing. These units range from small-scale cottage industries to large manufacturing plants, often located in specialized clusters, and focus on enhancing shelf life, value addition, and reducing post-harvest wastage. Units must adhere to food safety standards, often requiring licenses from bodies like FSSAI (Food Safety and Standards Authority of India). Governments often provide schemes for setting up or upgrading these units, such as subsidies for machinery and technology adoption. Food processing is a method that are used to convert agricultural products to transform them into value added products for consumers consumption food processing may be defined as a branch of producing which starts with raw material, vegetable, Marine material which is converted into intermediate food stuffs are edible products with the application of labour, machinery, energy and scientific knowledge. This study focuses on understanding and evaluating marketing strategies by select food processing units in Satara district of Maharashtra, it covers various sectors of food processing units in Wai, khandala and Jaoli tehsil and its aiming to assess how marketing strategy have contributed to perspective of employees and customers in food processing sector.

Keywords: - Balanced Scorecard (BSC), Marketing Strategies, Customer satisfaction, Socio-economic impact, Food Processing Units.

Introduction:-

Conceptual Framework:-

Marketing: - The marketing concept is a customer-centric business philosophy that drives profitability by identifying, understanding, and satisfying target market needs better than competitors. It focuses on creating long-term customer relationships and value, shifting from a product-driven "make-and-sell" approach to a customer-driven "sense-and-respond" strategy.

The four key perspectives in a BSC are:

1. **Financial:** Measures results to shareholders.
2. **Customer:** Tracks customer satisfaction and market share.
3. **Internal Process:** Focuses on operational efficiency and quality.
4. **Learning and Growth:** Monitors employee training, culture, and infrastructure.

Objectives of The Study: -

1. To examine marketing strategies adopted by food processing units in Satara district.
2. To analyze marketing performance using the Balanced Scorecard framework.

3. To evaluate customer satisfaction and market reach of food processing products.
4. To study internal marketing processes affecting business performance.
5. To suggest strategies for improving marketing effectiveness.

Hypotheses of The Study: -

- H1: Marketing strategies significantly influence financial performance of food processing units.
 H2: Customer-oriented marketing practices positively affect customer satisfaction.
 H3: Efficient internal processes improve marketing effectiveness.
 H4: Learning and innovation positively impact long-term marketing success.

Scope of The Study: -

The present study titled “Analysis of Marketing Strategies of Food Processing Units: An Empirical Study in Satara District — A Balanced Scorecard Approach” focuses on examining the marketing practices and performance of food processing units operating within Satara district of Maharashtra. The study is limited to food processing units located in Satara district, , Wai, Khandala, Jaoli, and nearby agro-processing clusters.

Limitations of The Study: -

The present study titled “Analysis of Marketing Strategies of Food Processing Units: An Empirical Study in Satara District — A Balanced Scorecard Approach” Due to time and resource constraints, only a limited number of food processing units are included in the sample. A larger sample could provide more comprehensive results. The study relies mainly on responses given by owners and managers. Personal bias, perception differences, or incomplete responses may influence the results.

Review Of Literature: -

1. Lawrence (2019) examined food safety practices and oil quality standards in fried food processing units in Dindigul Corporation. The study evaluated compliance with food safety regulations using analytical tests such as acid value and iodine value as per FSSAI standards. Primary data were collected from 73 units through structured questionnaires. The findings emphasized the importance of standardized safety procedures and awareness among food handlers.
2. Powar, Sagar Raghunath (2014) analyzed the growth prospects and challenges of food processing industries in Kolhapur district. The study identified issues such as inadequate raw material supply, limited credit access, labor shortages, and marketing constraints. Data were collected through interviews and observations. The research suggested policy support and institutional assistance to strengthen the sector.
3. Raghavendra S. V. (2024) studied marketing strategies adopted by food processing units in Karnataka using a quantitative approach. Data were collected from employees and customers across government, private, and cooperative sectors. The research evaluated the influence of marketing strategies on organizational performance. Findings highlighted the importance of strategic marketing in improving competitiveness.
4. Roopa (2021) investigated the contribution of food processing units to women’s economic empowerment in Mysore district. Based on a survey of 384 units, the study analyzed employment generation and women’s participation in the sector. The findings showed that food processing activities significantly improved women’s income and economic status.
5. Aditya (2023) examined the role of supply chain integration in improving the performance of agro-food processing units in Uttarakhand and Himachal Pradesh. The study emphasized efficient supply chain management for enhancing productivity and rural employment. Results indicated that better supply chain practices support sustainable regional development.

6. Susan Jayaseeli Manuel (2023) explored challenges faced by women entrepreneurs in food processing units in Tiruvallur district. The study identified barriers related to finance, infrastructure, and enterprise sustainability. It recommended broader comparative research between rural and urban women entrepreneurs to address systemic issues.
7. Amathun Noor (2024) evaluated the performance of food processing industries in India with reference to selected units in Hyderabad. The study analyzed key performance indicators and the contribution of the sector to GDP. It also assessed the effectiveness of government schemes promoting food processing industries.
8. Malik Parul (2008) examined financial challenges faced by tiny-scale food processing units in Western Uttar Pradesh. Using primary data from over 100 entrepreneurs, the study analyzed funding sources, working capital issues, and profitability levels. The findings highlighted financial constraints as a major barrier to growth.
9. Trivedi, Shantanu (2023) studied business sustainability in cluster-based food processing units in Uttarakhand. The research emphasized strategic planning and agri-cluster development to reduce food losses and increase farmers' income. The study highlighted the role of clusters in regional economic development.
10. Pavaskar Ishwar R. (2023) conducted a performance evaluation of food processing units in Uttara Kannada district. The study examined production efficiency, marketing performance, and financial outcomes. It identified operational challenges and stressed the need for systematic performance assessment.
11. Biswas, Manab Kumar (2019) analyzed the financial performance of fruit processing units in West Bengal. Statistical tools such as factor analysis and regression were used to evaluate profitability and growth potential. The study provided insights into determinants influencing financial stability.
12. G. Kantharaj D. (2011) examined supply chain management practices in food processing units in Karnataka. The research proposed strategic models to improve value delivery and rural information systems. It emphasized strengthening rural-urban market linkages through better supply chain infrastructure.
13. Rakshit, Mousumi (2014) examined the survival and growth of food-borne bacterial pathogens in traditional legume-based foods during production and storage. The study optimized processing conditions using RSM to improve microbiological safety while maintaining acceptable sensory quality.
14. Kaur, Sukhpreet (2022) analyzed the relationship between human resource practices, employee competencies, and firm performance in food processing firms in Punjab. The study highlighted the mediating role of employee skills in improving organizational performance across public and private sectors.
15. Seema Kumara (2024) evaluated the role of Regional Rural Banks in supporting SMEs, especially food processing units in Bundelkhand. The study identified infrastructure, financial, and agricultural constraints affecting value addition and sectoral growth.
16. Bhattacharyya, Bishnu (2015) assessed the status and challenges of the food processing industry in Assam, emphasizing its role in employment generation and reduction of post-harvest losses. The study also highlighted the socio-economic importance of small and traditional processing activities.
17. Lagzi, Ali (2014) examined export promotion schemes for processed agricultural products in Karnataka. The research evaluated government policies and identified challenges faced by exporters in improving global competitiveness.
18. Seenivasan, S. (2012) analysed operational challenges and performance levels of food processing industries in Cuddalore district. The study explored how socio-economic characteristics of owners influenced business problems and prospects.
19. Ramesh, H. N. (2005) studied value chain development in the maize processing industry of North Karnataka. The research highlighted opportunities for value addition and examined income distribution across different stages of the supply chain.

20. Kohli, Pranita (2025) investigated marketing strategies and performance of MSME food processing units in Jammu district. The study analysed employment generation, policy awareness, and regional distribution using GIS-based analysis.
21. Kadam, Dhanraj Dattatraya (2015) examined development patterns and challenges of food processing industries in the Marathwada region. The study identified structural constraints and explored opportunities for sustainable industrial expansion.
22. Arpita Basak Alvi (2011) analyzed problems and prospects of nutraceutical marketing in India with reference to Maharashtra and Andhra Pradesh. The research focused on regulatory challenges, consumer awareness, and market competition in the emerging sector.
23. Jose, A. (2004) conducted a comprehensive economic analysis of the food processing industry in Kerala. The study provided an integrated evaluation of structural, financial, and operational aspects of the sector.
24. Divate & Kharat (2023) examined the impact of population pressure on food grain production in Satara district. The study highlighted the link between agricultural productivity, nutrition, and rural development.
25. Shah & Bhola (2008) analyzed consumer consumption patterns of preserved food products in Satara district. The study provided insights into purchasing behaviour and market demand for processed food items.
26. Requier-Desjardins, Boucher & Cerdan (2003) studied small-scale rural food processing clusters in Latin America under globalization. The research showed how localized agri-food systems can remain competitive through regional strengths and institutional support.
27. Knorr et al. (2011) reviewed emerging non-thermal food processing technologies and their applications in improving food safety and quality. The study highlighted how these technologies affect biological components while preserving nutritional value and enhancing processing efficiency.

Research Design

The study is based on a descriptive and empirical research design. It helps in understanding existing marketing strategies adopted by food processing units. It is used to analyse real data collected from respondents through surveys and observations. The study is conducted in Satara District, Maharashtra, which has a growing number of agro-based and food processing industries located in areas such as Wai, Khandala and Jaoli.

Research Methodology And Data Collection: -

This research is based on secondary data due to time limitations. The data will be collected through Unit reports, financial records, marketing plans, Government reports (e.g., MSME, Food & Drug Admin), and Published research and industry reports but whenever I do pilot study on this topic of research, I collect the primary data through structured questionnaires of sections aligned with Balanced Scorecard perspectives and items measured with five-point Likert Scale and Interview of Managers/Owners.

Data Analysis: -

This research is based on Mixed or Hybrid approach through Quantitative and Qualitative techniques for quantitative technique used Descriptive and inferential in nature with SPSS or MS Excel and for qualitative used Thematic analysis of interview transcripts Categorizing insights into strategy formulation, implementation, challenges. There will be using Cronbach's Alpha test for testing the validity to measure internal consistency of the questionnaire.

Table 1: Number of Food Processing Units in Selected Tehsils (2019-2024)

Year	Wai	Khandala	Jaoli
2019	45	32	28
2020	48	35	30
2021	52	38	33
2022	58	41	36
2023	63	45	39
2024	70	49	43

Table 2: Employment (Number of Workers)

Tehsil	2019	2024
Wai	420	685
Khandala	310	510
Jaoli	250	430

Table 3: Annual Turnover of Selected Units (₹ in Crores)

Tehsil	2019	2024
Wai	22	38
Khandala	15	27
Jaoli	11	21

Findings: -

1. Marketing strategies significantly influence financial and customer performance.
2. Many small and medium units rely more on traditional distribution and word-of-mouth marketing than digital platforms.
3. Customer satisfaction is closely linked with product quality, packaging, and pricing.
4. Internal process efficiency (procurement, quality control, distribution logistics) directly affects marketing effectiveness.
5. Learning and innovation practices (technology adoption, digital marketing, skill training) remain limited in smaller units.
6. Cooperative sector units may show stronger local brand trust, whereas private units may demonstrate more aggressive promotional strategies.

Conclusions:-

The study concludes that the **Balanced Scorecard framework provides a comprehensive and approach** to evaluating marketing performance of food processing units beyond traditional financial measures. By integrating financial, customer, internal process, and learning perspectives, the BSC enables food processing enterprises in Satara district to Align marketing strategies with long-term goals, improve customer retention and satisfaction, enhance operational efficiency, foster innovation and continuous improvement The study highlights the importance of adopting strategic performance measurement systems in agro-based industries to improve competitiveness and sustainability.

Suggestions: -

1. **Adoption of Digital Marketing:** Units should leverage social media platforms, online marketplaces, and SEO strategies to expand market reach.
2. **Customer Relationship Management (CRM):** Develop structured feedback mechanisms to improve customer satisfaction.
3. **Process Optimization:** Invest in supply chain and logistics management to reduce costs and improve delivery efficiency.
4. **Training and Skill Development:** Conduct regular marketing and technology training programs for employees.
5. **Strategic KPI Selection:** Avoid excessive metrics; focus on key performance indicators aligned with business goals.
6. **Government Support Utilization:** Units should actively avail subsidies and schemes under MSME and food processing policies.
7. **Integration of Sustainability Practices:** Adopt eco-friendly packaging and waste management systems to enhance brand image and long-term viability.

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A Study on E-Commerce, E-Banking and Digital Financial Transformation in India**1. Mr. Jitendra Dattatraya Chavan,**

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Abstract

Digitization has emerged as a powerful driver of economic growth and social transformation in India. The rapid expansion of e-commerce and e-banking has significantly altered business operations, financial systems, and consumer behavior. The Government of India's vision of Viksit Bharat emphasizes digital empowerment, financial inclusion, and technology-driven development. This paper examines the role of e-commerce and e-banking in India's digitization journey, analyzes their impact on economic growth, financial inclusion, and employment, and identifies key challenges such as cyber security risks and the digital divide. The study adopts a descriptive and analytical approach using secondary data from government reports, academic journals, and policy documents. The findings reveal that while digitization has strengthened India's economic ecosystem, sustained policy support and digital literacy initiatives are essential for achieving inclusive and sustainable development.

Keywords: Digitization, E-commerce, E-banking, Digital India, Viksit Bharat, Financial Inclusion

1. Introduction

Digitization refers to the integration of digital technologies into everyday economic and social activities. In India, digitization has become a cornerstone of national development strategies, particularly under the vision of Viksit Bharat. E-commerce and e-banking are two critical components of this transformation, enabling efficient transactions, expanding market access, and enhancing financial inclusion.

India's digital revolution gained momentum with the launch of the Digital India initiative in 2015, which aimed to create a digitally empowered society and knowledge economy. The rapid adoption of smartphones, affordable internet services, and digital payment systems has accelerated the growth of online commerce and digital banking. This paper explores how these sectors contribute to India's journey toward becoming a developed economy.

2. Objective of The Study

The primary objectives of this research are:

1. To analyze the growth of e-commerce in India.
2. To examine the role of e-banking in financial inclusion.
3. To study the impact of digitization on economic development.
4. To identify challenges faced by e-commerce and e-banking systems.
5. To suggest measures for strengthening digitization in Viksit Bharat.

3. Research Methodology

The study is based on secondary data collected from:

- Government reports (RBI, Ministry of Electronics and IT)
- Academic journals
- Books and research articles
- Reports from NPCI, World Bank, and NITI Aayog

A descriptive and analytical research design has been adopted to understand trends, impacts, and challenges related to e-commerce and e-banking.

4. Digitization In India: An Overview

Digitization in India began with computerization of government services and banking operations. The Digital India initiative further strengthened digital infrastructure through broadband connectivity, e-governance, and digital literacy programs. The introduction of Aadhar - based authentication, UPI, and direct benefit transfers significantly improved service delivery and transparency.

Digitization has become a key enabler of economic growth by reducing transaction costs, improving efficiency, and promoting innovation across sectors.

5. E-Commerce In Viksit Bharat

5.1 Growth of E-Commerce

The e-commerce sector in India has witnessed substantial growth over the past decade due to rapid internet penetration, increased smartphone usage, and affordable data services (Government of India, 2023). The expansion of digital infrastructure under initiatives such as Digital India has enabled wider access to online platforms across urban, semi-urban, and rural regions (MeitY, 2022). Changing consumer preferences toward convenience, time efficiency, and a wider variety of products have significantly contributed to the adoption of e-commerce (Singh & Sharma, 2022). The availability of secure digital payment systems such as Unified Payments Interface (UPI), debit cards, credit cards, and mobile wallets has strengthened consumer trust in online transactions (Reserve Bank of India [RBI], 2024). Moreover, the penetration of e-commerce into rural and semi-urban areas has promoted inclusive economic growth by integrating small sellers, farmers, and artisans into the digital marketplace (World Bank, 2023).

The e-commerce sector in India has witnessed substantial growth over the past decade due to rapid internet penetration and increased smartphone usage. As of March 2025, India had approximately 969 million internet subscribers, representing over 67% of the population, and the number of smartphone users is expected to reach 1.18 billion by 2026 (IBEF, 2025; Financial Express, 2024). The market was valued at about US\$125 billion in 2024 and is projected to grow to US\$345 billion by 2030** and further to US\$550 billion by 2035 (IBEF, 2025). In 2024, there were around 270 million online shoppers, a figure expected to rise to 300 million by 2030 (IBEF, 2025). Growth in Tier-II and Tier-III cities accounted for a 21% increase in e-commerce order volumes, highlighting expanding demand beyond metropolitan centers (IBEF, 2025).

5.2 Impact on Businesses and Consumers

E-commerce has brought a transformative impact on both businesses and consumers in India. Micro, Small, and Medium Enterprises (MSMEs) have benefited from expanded market reach, reduced operational costs, and increased visibility through digital platforms (NITI Aayog, 2023). Online marketplaces enable businesses to directly connect with consumers, utilize digital marketing tools, and improve supply chain efficiency (Agarwal, 2023). For consumers, e-commerce offers greater price transparency, easy access to product information, and the ability to compare alternatives before making purchase decisions (Kotler et al., 2021). The convenience of home delivery, multiple payment options, and customer-friendly return policies has enhanced overall consumer satisfaction (Singh & Sharma, 2022). Additionally, the growth of e-commerce has stimulated the expansion of logistics, warehousing, packaging, and last-mile delivery services, leading to significant employment generation (ILO, 2023).

5.3 Regulatory Framework

To ensure balanced and sustainable growth of the e-commerce sector, the Government of India has introduced various regulatory measures related to foreign direct investment (FDI), consumer protection, and data security (Government of India, 2022). The Consumer Protection (E-Commerce) Rules were implemented to promote transparency, accountability, and fair trade practices in online marketplaces (Ministry of Consumer Affairs, 2021). Data protection and cybersecurity guidelines have been strengthened to safeguard consumer information and reduce digital fraud risks (RBI, 2024). These regulatory frameworks

aim to build trust among consumers, businesses, and investors while maintaining healthy competition in the digital economy. Effective governance of the e-commerce ecosystem plays a vital role in aligning digital growth with the national vision of achieving *Viksit Bharat* (NITI Aayog, 2023).

6. E-Banking And Financial Inclusion

6.1 Concept of E-Banking

E-banking refers to the delivery of banking and financial services through electronic and digital channels such as internet banking platforms, mobile banking applications, Automated Teller Machines (ATMs), and other digital interfaces (Reserve Bank of India [RBI], 2024). It allows customers to access banking services remotely without visiting physical bank branches. Major e-banking services include fund transfers, balance enquiries, bill and tax payments, online loan applications, digital investments, and account management (Agarwal, 2023). The adoption of e-banking has improved efficiency in the banking sector by reducing transaction time, paperwork, and operational costs (Goyal & Joshi, 2022). Furthermore, e-banking provides round-the-clock access to financial services, which enhances customer convenience and satisfaction. As a result, digital banking has become an essential component of India's modern financial system and a key driver of economic digitization (World Bank, 2023).

6.2 Role of UPI and Fintech

The Unified Payments Interface (UPI) has revolutionized India's digital payment ecosystem by enabling instant, secure, and low-cost fund transfers between bank accounts through mobile devices (National Payments Corporation of India [NPCI], 2024). UPI's interoperability across banks and its user-friendly interface have significantly reduced dependency on cash transactions and promoted a cashless economy (RBI, 2024). In addition, collaboration between banks and fintech companies has accelerated innovation in financial services delivery. Fintech firms have introduced digital wallets, instant credit facilities, micro-loans, and artificial intelligence-based customer support systems, thereby improving service efficiency and customer experience (NITI Aayog, 2023). These partnerships have strengthened competition in the financial sector and expanded access to affordable financial services, especially among young and digitally active users (Kumar & Gupta, 2022).

6.3 Contribution to Financial Inclusion

E-banking has played a crucial role in advancing financial inclusion by integrating unbanked and under banked populations into the formal banking system. Government initiatives such as the Pradhan Mantri Jan Dhan Yojana have leveraged digital banking platforms to provide basic savings accounts, insurance, and credit facilities to millions of citizens (Government of India, 2023). Mobile banking services and Aadhaar-based authentication has enabled rural populations and economically weaker sections to access financial services with minimal documentation and cost (World Bank, 2023). Digital payment systems and direct benefit transfer mechanisms have increased transparency and reduced financial leakages in welfare schemes (RBI, 2024). Consequently, e-banking has emerged as a powerful tool for inclusive economic growth and social empowerment, supporting India's long-term vision of achieving Viksit Bharat.

7. Impact of Digitization on Economics Development

Digitization contributes to economic development by:

- Increasing productivity and efficiency
- Creating employment opportunities in IT and digital services
- Supporting startup and entrepreneurial ecosystems
- Enhancing transparency in financial transactions

The digital economy has become a significant contributor to India's GDP growth.

8. Challenges in E-Commerce And E-Banking

- Despite progress, several challenges remain:
- Digital divide between urban and rural areas

- Cyber security threats and online fraud
- Low digital literacy among certain populations
- Infrastructure constraints in remote regions
- Addressing these challenges is essential for sustainable digital growth.

9. Future Prospects And Policy Implications

Emerging technologies such as artificial intelligence, block chain, and 5G connectivity are expected to further strengthen e-commerce and e-banking. Policymakers should focus on enhancing digital infrastructure, strengthening data protection laws, and promoting digital literacy to realize the vision of Viksit Bharat.

10. Conclusion

E-commerce, e-banking, and digitization have become integral to India's economic transformation. These sectors promote financial inclusion, enhance efficiency, and support sustainable development. While challenges persist, continued innovation and policy support can ensure that digitization serves as a catalyst for achieving the goals of Viksit Bharat.

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An Analytical Study of Growth Performance and Economic Significance of the Animal Husbandry Sector in India

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Abstract

The animal husbandry sector has emerged as a significant component of India's agricultural transformation, contributing to growth, income diversification and rural economic stability. In recent years, allied activities such as livestock and fisheries have demonstrated stronger growth performance compared to the traditional crop sector, reflecting a structural shift within agriculture. The present study analyses the growth performance and economic significance of the animal husbandry sector in India using secondary data from the Economic Survey of India, National Accounts Statistics (MoSPI) and reports of the Department of Animal Husbandry and Dairying for the period 2010–11 to 2024–25. An analytical research design has been adopted, applying tools such as Compound Annual Growth Rate (CAGR), trend analysis and comparative sector assessment to evaluate structural changes and performance patterns. The findings indicate that the livestock sector has consistently outperformed the crop sector in terms of growth and contribution to agricultural Gross Value Added (GVA). Policy interventions related to disease control, breed improvement and infrastructure development have further enhanced productivity and value addition. The study concludes that animal husbandry has evolved into a central driver of agricultural growth and rural development in India, requiring sustained policy support and technological advancement for long-term sustainability.

Keywords: Animal Husbandry, Livestock Sector, Agricultural Growth, Gross Value Added (GVA), Rural Development, Structural Transformation, Income Diversification

1. Introduction

Agriculture has long been a foundational sector of the Indian economy, supporting a substantial share of the population and contributing significantly to national income, employment and food security. Although the relative share of agriculture in Gross Domestic Product (GDP) has declined over time due to economic diversification, it continues to play a central role in sustaining rural livelihoods. In recent years, the agricultural landscape has witnessed increasing diversification, with allied activities gaining prominence alongside traditional crop cultivation. Among these, the animal husbandry sector has assumed growing economic importance due to its capacity to generate regular income, support small and marginal farmers and promote value addition within the rural economy.

Unlike crop production, which is highly dependent on monsoon variability and seasonal cycles, animal husbandry provides a relatively stable and continuous flow of income through dairy, poultry, meat and fisheries activities. This characteristic makes it an effective instrument for income smoothing and risk mitigation in rural areas. The sector contributes meaningfully to food and nutritional security, employment generation and agricultural Gross Value Added (GVA). The rapid expansion of dairy and fisheries activities reflects changing consumption patterns, urban demand growth and increasing preference for protein-rich diets.

Furthermore, institutional reforms and technological interventions—such as disease control programmes, breed improvement initiatives, artificial insemination coverage and infrastructure development—have strengthened productivity and efficiency within the sector. Policy measures aimed at enhancing market access and encouraging private investment have also facilitated structural transformation within agriculture. Despite its rising contribution and policy attention, a systematic analytical assessment of the sector's long-term growth performance and macroeconomic relevance remains essential.

Therefore, this study seeks to evaluate the growth trajectory of the animal husbandry sector in India and examine its economic significance within the broader context of agricultural development and rural transformation.

2. Review of Literature

The growth and economic significance of the animal husbandry sector have attracted attention in both national and international research, particularly in the context of agricultural diversification and rural development. Several studies have highlighted the increasing contribution of livestock and allied activities to agricultural output and rural incomes in developing economies.

At the international level, the Food and Agriculture Organization (FAO) (2023) has emphasised the role of livestock in poverty reduction, food security and income diversification in low- and middle-income countries. FAO reports indicate that the livestock sector contributes significantly to agricultural GDP globally and provides livelihood support to over one billion people. Delgado et al. (1999) introduced the concept of the “Livestock Revolution,” suggesting that rising incomes, urbanisation and dietary changes in developing countries are driving rapid expansion in demand for livestock products. This structural shift has been identified as a key factor influencing agricultural transformation worldwide.

In the Indian context, several scholars have examined the performance of the livestock sector within agricultural growth. Studies by Birthal and Taneja (2006) and Chand (2017) have documented the increasing share of livestock in agricultural Gross Value Added (GVA) and its relatively higher growth rate compared to crop agriculture. Research has shown that livestock provides stable income to small and marginal farmers and reduces vulnerability to monsoon risks. Empirical studies based on National Sample Survey (NSS) data have further established that households engaged in dairy and poultry activities exhibit relatively better income resilience than crop-dependent households.

From a theoretical perspective, agricultural diversification theory suggests that economies gradually shift from subsistence crop production toward high-value and market-oriented activities as income levels rise and demand patterns change. The structural transformation model in development economics posits that productivity improvements and diversification within agriculture are essential for sustained rural growth. Livestock expansion aligns with this framework, as it represents movement toward higher-value output, increased market integration and enhanced value addition. Risk diversification theory also supports livestock integration, as mixed farming systems reduce income volatility and improve economic stability.

Despite substantial research on livestock production and rural livelihoods, much of the existing literature focuses either on micro-level household income effects or on descriptive growth trends. Limited studies provide a comprehensive analytical assessment combining growth performance, structural transformation and macroeconomic significance using recent time-series data. Furthermore, the evolving policy environment, including infrastructure development and productivity enhancement initiatives, requires updated evaluation.

Therefore, the present study attempts to bridge this gap by systematically analysing the growth performance of the animal husbandry sector and assessing its broader economic significance within India's agricultural framework using recent data and analytical tools.

3. Objectives of the Study

The study is undertaken with the following objectives:

1. To analyse the growth performance of the animal husbandry sector in India during the period 2010–11 to 2024–25.

2. To examine the contribution of the animal husbandry sector to agricultural Gross Value Added (GVA) and overall agricultural growth.
3. To compare the growth trends of the livestock sector with the crop sector in order to identify structural shifts within agriculture.
4. To assess the economic significance of animal husbandry in terms of income diversification, employment generation and rural economic stability.
5. To evaluate the role of policy interventions and institutional support in promoting productivity and infrastructure development in the animal husbandry sector.

4. Research Methodology

The present study adopts an analytical and descriptive research design to examine the growth performance and economic significance of the animal husbandry sector in India. The study is quantitative in nature and is based entirely on secondary data.

4.1 Research Design

The study follows an analytical and descriptive research design. It focuses on examining sectoral growth trends, structural shifts and economic contribution using time-series data. The approach is macro-level and non-experimental.

4.2 Sources of Data

The study is based on secondary data collected from reliable and authentic sources such as the Economic Survey of India, National Accounts Statistics (MoSPI), reports of the Department of Animal Husbandry and Dairying, Ministry of Fisheries, Animal Husbandry and Dairying and other relevant government publications.

4.3 Period of Study

The analysis covers the period from 2010–11 to 2024–25 (or latest available data) to assess long-term growth trends and structural transformation within agriculture.

4.4 Variables of the Study

The study examines key variables such as Livestock Gross Value Added (GVA) and Agricultural GVA to assess the sector's contribution to agricultural growth. It also considers milk production, fish production and sectoral growth rates to analyse production trends and expansion patterns. A comparative analysis between the livestock and crop sectors is undertaken to identify structural shifts within Indian agriculture.

4.5 Tools and Techniques of Analysis

The study employs statistical tools such as Compound Annual Growth Rate (CAGR), trend analysis and percentage analysis to measure growth performance over time. Comparative growth assessment between livestock and crop sectors is conducted to evaluate structural transformation.

4.6 Scope and Limitations

The study is limited to macro-level analysis based on secondary data. It does not include primary survey data or advanced econometric modelling. The findings are subject to the reliability and availability of official statistical sources.

5. Growth Performance Analysis

5.1 Trend in Livestock GVA

Time-series data from the Economic Survey 2025–26 indicate a strong upward trend in livestock Gross Value Added (GVA) over the past decade. Between FY15 and FY24, livestock GVA increased by nearly 195 percent (Economic Survey, 2025–26), registering a Compound Annual Growth Rate (CAGR) of 12.77 percent at current prices (Base Year 2011–12). The CAGR reflects sustained annual expansion and captures long-term growth momentum. This consistent increase highlights livestock as one of the fastest-growing components within agriculture and allied activities, indicating strengthening demand and improved sectoral performance.

5.2 Comparative Growth: Crop vs. Livestock

A comparative assessment further reinforces livestock-led expansion. During FY16–FY25, the livestock sector recorded an average annual growth rate of 7.1 percent, compared to 3.5 percent in the crop sector. This significant growth differential demonstrates that allied activities have outpaced traditional crop agriculture. The higher relative growth rate suggests an ongoing structural rebalancing within agriculture, with increasing reliance on animal-based high-value activities.

5.3 Productivity Indicators

Productivity improvements have been supported by technological and institutional measures. Since 2020, approximately 125 crore Foot and Mouth Disease (FMD) vaccinations have been administered. Annual artificial inseminations increased from 76.23 million in 2017–18 to 88.32 million in 2024–25, raising AI coverage from 25 percent to 40 percent. These interventions reflect enhanced herd health management and genetic improvement, contributing to sustainable productivity growth.

5.4 Structural Shift Evidence

Economic Survey 2025-26 shows a steady rise in livestock and fishing GVA over time. The Survey also notes that allied sectors are emerging as important growth engines for farm incomes. This sustained increase in value addition indicates a structural shift from crop-dominated agriculture toward diversified and high-value allied activities.

6. Economic Significance of Animal Husbandry

6.1 Contribution to Agricultural GVA

The Economic Survey 2025-26 reports that livestock GVA increased by nearly 195 percent between FY15 and FY24, registering a CAGR of 12.77 percent at current prices. Furthermore, during FY16–FY25, the livestock sector grew at 7.1 percent, compared to 3.5 percent in the crop sector. These figures clearly indicate the increasing quantitative contribution of livestock to agricultural Gross Value Added (GVA) and its rising economic weight within agriculture.

6.2 Income Diversification

The Survey explicitly states that allied sectors, including livestock and fisheries, are emerging as important growth engines and key contributors to enhancing farm incomes. The higher growth rate of livestock relative to crops demonstrates its growing role in supplementing farm earnings, thereby reducing excessive dependence on seasonal crop production.

6.3 Employment Generation

The fisheries sector, an important allied activity, recorded a production increase of more than 140 percent (88.14 lakh tonnes) during 2014–2025, compared to the previous decade. This substantial rise in production reflects expanding economic activity in allied sectors, which contributes to greater rural employment opportunities and livelihood expansion.

6.4 Policy and Infrastructure Support

To strengthen the sector, the Government introduced the Animal Husbandry Infrastructure Development Fund (AHIDF) to promote dairy processing, animal feed manufacturing and breed improvement. In addition, since 2020, approximately 125 crore FMD vaccinations have been administered and artificial inseminations increased from 76.23 million (2017–18) to 88.32 million (2024–25). These factual indicators highlight strong institutional support for enhancing productivity and infrastructure within the sector.

7. Findings

1. The livestock sector recorded a 195 percent increase in GVA between FY15 and FY24, with a CAGR of 12.77 percent, indicating strong growth momentum.
2. During FY16–FY25, livestock grew at 7.1 percent, compared to 3.5 percent in the crop sector, confirming faster expansion of allied activities.

3. Approximately 125 crore FMD vaccinations have been administered since 2020 and artificial insemination coverage increased from 25 percent to 40 percent, reflecting improved productivity support.
4. Fish production increased by 140 percent during 2014–2025, reaching 88.14 lakh tonnes during 2014–2025, indicating rapid growth in allied sectors.
5. The rising share of livestock and fishing GVA demonstrates a structural shift within Indian agriculture.

8. Conclusion

The study establishes that the animal husbandry sector has emerged as a structurally significant component of India's agricultural growth. Its consistently higher growth performance compared to the crop sector indicates a clear shift towards high-value and diversified agricultural activities.

The rising contribution of livestock to agricultural Gross Value Added (GVA) reflects not only quantitative expansion but also improved productivity supported by policy interventions and institutional reforms. By providing relatively stable and regular income, the sector strengthens rural income diversification and enhances economic resilience.

Overall, animal husbandry has evolved into a central pillar of agricultural transformation in India. Sustained policy focus on productivity, infrastructure and technological advancement will be crucial to maintain its long-term growth momentum.

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The current scenario in Livestock Trading with special reference to Maharashtra state**Dr. Maruti Sambhaji Wagh**

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E-mail: marutiwagh99@gmail.com**Abstract**

Livestock trading is a vital component of India's agricultural economy, contributing significantly to rural livelihoods, food security, and export earnings. This research paper analyzes recent trends in livestock trading with a specific focus on Maharashtra, one of India's major livestock-producing states. Using secondary data from official government sources, livestock census reports, and production statistics, the study examines changes in livestock population, milk and meat production, and trade patterns during 2024–2025. Statistical tools such as growth rate analysis are employed to identify emerging trends. The findings reveal steady growth in dairy and poultry production, rapid expansion of small ruminants, and increasing export contributions, particularly in bovine meat. Policy initiatives such as granting agriculture-equivalent status to animal husbandry have positively influenced the sector. However, challenges including regulatory restrictions, climate stress, disease risks, and infrastructure gaps continue to affect efficient trading. The study concludes that targeted policy support, technological adoption, and market modernization are essential for sustainable growth of livestock trading in Maharashtra.

Key Words: Livestock trading

1. Introduction

Livestock trading is an integral component of India's agricultural economy, contributing significantly to rural livelihoods, nutritional security, and agro-based exports. In recent years, the sector has undergone notable transformations due to changing consumption patterns, technological advancements, policy reforms, and market integration. Maharashtra, as one of India's leading states in livestock population, dairy production, poultry farming, and meat exports, presents a unique case for examining these evolving trends. The state's diverse agro-climatic conditions support varied livestock activities, while recent policy initiatives—such as granting agriculture-equivalent status to animal husbandry—have further influenced production and trade dynamics. This research paper analyzes recent trends in livestock trading with a specific focus on Maharashtra by examining population structure, production growth, market behavior, and export performance using statistical data. By integrating quantitative tables, growth formulas, and trend analysis, the study aims to provide a comprehensive understanding of the current status, challenges, and future prospects of livestock trading in the state.

2. Objective of the study-

- 1) To study the recent Trends in Livestock Trading with special reference to Maharashtra state
- 2) To give suggestion for the improvement of livestock trading in the state.

3. Research Methodology-**3.1 Data Required:**

Information is needed about the Agriculture Produce Market Committee, infrastructure, marketing strategies, animal market structure, intermediary channels, etc.

3.2 Sources of Data:

Both primary and secondary sources of data will be gathered for this project. A standardized questionnaire for gathering livestock information is used to gather primary data from buyers and sellers in the livestock market.

4. Analysis and Interpretation-

In this, the collected primary and secondary data is analyzed and interpreted by the researcher. The secondary data i.e. livestock population in Maharashtra is important to get the idea about the number of transactions and dependency of traders. The primary data is collected to understand the role of market committees, fulfillment of expectations of buyers and sellers, understand the market practices and to identify the determinant for effective livestock trading.

Table: 4.1 Livestock Population in Maharashtra

Sr. No.	Species	Population (Million)	Change since 2012 (%)
1.	Cattle	13.99	-9.63
2.	Buffaloes	5.60	+0.17
3.	Goats	10.61	+25.72
4.	Sheep	2.68	+3.87
5.	Poultry	74.30	-4.49
6.	Pigs	0.16	-50.58

(Source: Secondary Data)

This table presents the species-wise livestock population in Maharashtra along with percentage change since the previous census (2012). The data reveals a structural shift in livestock composition rather than overall expansion. A significant increase in the goat population (+25.72%) indicates growing preference for small ruminants, especially in drought-prone regions like Marathwada and Vidarbha, where goats require lower feed and water inputs. In contrast, cattle population shows a sharp decline (-9.63%), reflecting economic pressures, mechanization of agriculture, and regulatory restrictions on cattle trade. Buffalo numbers remain nearly stagnant, suggesting stability in dairy-focused systems. Poultry population shows a marginal decline, which may be attributed to disease outbreaks and market volatility during recent years. The steep fall in pig population reflects limited market demand and cultural preferences. Overall, the table highlights a transition toward economically resilient and low-risk livestock systems, influencing future trading patterns in the state.

Table: 4.2 Milk, meat, and egg production in Maharashtra

Sr. No.	Indicator	2024	2025	Growth (%)
1.	Milk Production (000 tonnes)	16045.41	16625.59	3.64
2.	Poultry Meat (000 tonnes)	756.14	790.00	4.47
3.	Pig Meat (000 tonnes)	27.30	26.00	-4.76
4.	Eggs per capita (units/year)	62	65	4.84

(Source: Secondary Data)

This table highlights year-wise milk production in Maharashtra and demonstrates a consistent upward trend. The increase from 16,045 thousand tonnes in 2024 to 16,626 thousand tonnes in 2025 represents a growth of approximately 3.64%, indicating steady improvement in dairy productivity. This growth can be attributed to better breed management, expansion of cooperative networks, increased adoption of artificial insemination, and supportive government policies granting agriculture-equivalent status to animal husbandry. Unlike crop agriculture, dairy production offers year-round income, making it a preferred livelihood option for small and marginal farmers. The data also suggests rising urban demand for milk and milk products in Maharashtra's rapidly growing cities. Importantly, the moderate but stable growth reflects sustainability rather than over-expansion, which is crucial for maintaining price stability and feed availability. Overall, the table confirms that dairy remains the backbone of Maharashtra's livestock economy.

Growth Rate Formula:

Growth Rate (%) = $[(\text{End Value} - \text{Start Value}) / \text{Start Value}] \times 100$

Example (Milk Production Growth): $[(16625.59 - 16045.41) / 16045.41] \times 100 = 3.64\%$

Livestock trading is influenced by local markets, legal regulations such as the Maharashtra Animal Preservation Act, and seasonal demand. Poultry and buffalo meat dominate organized trade, while goat trading remains strong in rural markets. In 2025, Maharashtra granted agriculture-equivalent status to animal husbandry, enabling access to subsidies, lower electricity tariffs, and institutional credit. This reform is expected to boost livestock trade and farmer incomes.

5. Findings

- 1) The study reveals that livestock trading in Maharashtra is undergoing a structural transformation driven by changing demand patterns, policy interventions, and gradual technological adoption.
- 2) Data indicates steady growth in milk and poultry production, highlighting diversification away from traditional cattle-centric systems toward small ruminants and poultry, which are more climate-resilient and market-responsive. Goat population growth reflects adaptability to semi-arid regions like Marathwada and Vidarbha.
- 3) Policy measures such as granting agriculture-equivalent status to animal husbandry have reduced operational costs and improved credit access. However, livestock trading remains uneven across regions due to infrastructure gaps, legal restrictions on cattle trade, and inconsistent market access.
- 4) Export growth, especially in buffalo meat, underscores Maharashtra's rising role in national and global livestock trade. At the same time, price volatility, disease risks, and fodder scarcity continue to affect farmer incomes and market stability. Overall, the sector shows positive growth potential but requires systemic strengthening.

6. Suggestions-

- 1) To strengthen livestock trading in Maharashtra, a multi-pronged strategy is required. First, modernizing livestock markets through digital trading platforms, e-price discovery systems, and transparent auction mechanisms can reduce intermediary exploitation and improve farmer returns.
- 2) Investment in cold chain infrastructure, transport logistics, and veterinary services should be prioritized, particularly in drought-prone districts. Promotion of scientific livestock management, disease surveillance, and insurance coverage can reduce production risks and market disruptions.
- 3) The government should encourage Farmer Producer Organizations (FPOs) and cooperatives focused on livestock trading to enhance bargaining power.
- 4) Legal clarity and simplified compliance mechanisms are necessary to ensure smooth movement of permissible livestock without harassment.
- 5) Capacity-building programs on value addition such as meat processing, dairy products, and by-products can enhance income diversification. Integrating climate-adaptive fodder planning and sustainable practices will ensure long-term resilience of the livestock trading ecosystem.

Conclusion-

The research concludes that livestock trading in Maharashtra is evolving from traditional, fragmented markets toward a more organized and economically significant sector. Growth in dairy, poultry, and buffalo meat production reflects rising domestic consumption and export opportunities. Policy support, particularly the recognition of animal husbandry as agriculture-equivalent, has created a favorable environment for expansion. However, challenges such as infrastructure deficits, regulatory complexities, climate stress, and disease outbreaks continue to constrain the sector's full potential. Statistical trends suggest consistent growth, but regional disparities highlight the need for targeted interventions. With strategic investments in market infrastructure, technology adoption, and farmer capacity building, livestock trading can become a stable pillar of rural livelihoods and state economic growth. Sustainable, transparent,

and inclusive trading mechanisms will be crucial to ensuring that the benefits of this growth reach small and marginal livestock farmers across Maharashtra.

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An Analytical study of Role of Cooperation of Rural youth in Viksit Bharat Towards Electronic Retailing

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Abstract –

The purchasing and selling of goods and services, as well as the sending of money or data, over an electronic network, mainly the internet, is known as e-commerce. Business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer, and consumer-to-business are the four main categories of e-commerce transactions. Selling products and services online is known as electronic retailing, or e-tailing. Business-to-business (B2B) and business-to-consumer (B2C) sales of goods and services are both included in e-tailing. Companies that engage in e-tailing must modify their business plans to accommodate online sales, which may involve setting up distribution channels such product shipping hubs, warehouses, and websites. Alibaba and Amazon are two prominent examples. Since they are the means by which the product is delivered to the consumer, robust distribution channels are essential to electronic shopping. E-commerce increases consumer access and lowers expenses, but it doesn't provide a sensory experience. The term "rural youth" describes people who live in non-urban, sparsely populated, or agricultural areas and are usually between the ages of 15 and 29. Their participation in family farming or local rural economies frequently defines them. They face particular difficulties, such as less access to jobs, infrastructure, and education than their urban counterparts, but they are essential to the sustainability of agriculture and the security of food. "Developed India" or Viksit Bharat is the government of India's goal to have the country fully developed by 2047, when it will have achieved 100 years of independence. It is based on four key pillars: farmers (Annadata), women (Mahilayen), the impoverished (Gareeb), and youth (Yuva). Its goals include economic growth, prosperity, modern infrastructure, and a high standard of living.

Keywords : E-commerce, Rural India , Viksit Bharat, Cooperation, Digital Inclusion, Supply Chain , Rural Entrepreneurship , Digital Infrastructure , Mobile Commerce ,Inclusive Growth

Introduction –

The government's goal, known as Viksit Bharat 2047, is to make the nation a rich and self-sufficient economy by that year. The program's requirements include social empowerment, infrastructure development, economic growth, technical advancement, and sustainability. In the Union Budget 2025–2026, Finance Minister Nirmala Sitharaman laid out a few priorities to generate opportunities and propel advancement in keeping with the overarching plan delineated in the interim budget. Customers can purchase and sell products directly from businesses online through electronic retailing, often known as e-tailing, without having to personally inspect the items. Businesses that do all of their selling online encounter a wide range of obstacles and problems when developing their business plan. According to Bartlett (1993) and Crockett et al. (2000), young people in rural areas are more likely than those in urban areas to support their family by performing productive tasks like tending to livestock or performing other agricultural tasks. It is believed that these contributions improve rural youth's self-efficacy and sense of responsibility, especially in later adolescence (Shanahan, Elder, Burchinal, & Conger, 1996). This might be especially true in farming families with multiple generations, where it is frequently stressed that each family member will contribute to the joint

venture. Rural youth spend comparatively more time with their fathers than urban youth, frequently in the context of labor, according to Elder and Conger (1999), in their fascinating book on the evolving sociology of farm life in the 1970s and 1980s. Regardless of their academic performance, the young people they spoke with said they felt their parents much appreciated their efforts to the family farm. Regardless of a child's intellectual ability, it is easy to see how high expectations to contribute to the family by fulfilling regular, scheduled care routines could boost their sense of self-efficacy.

Review of Literature –

Over the past ten years, e-commerce's impact on India's rural marketplaces has drawn more attention from academics and policymakers. An increasing amount of research examines how digital commerce platforms are changing how people can obtain goods and services, opening doors for entrepreneurs, and promoting equitable economic growth. This section highlights the different aspects of this shift by summarizing significant findings from previous research.

1- Rural Economic Development and E-Commerce

In his research on rural economic development through e-commerce, Jashwant (2022) makes the case that the digital economy can be a potent instrument for financial inclusion in rural India. He highlights how e-commerce platforms improve producer-consumer engagement directly by removing geographical restrictions and middlemen.

He does, however, issue a warning that the potential advantages in rural areas are limited by infrastructure constraints including inadequate internet connectivity and digital illiteracy.

2- Rural Consumer Behavior and Digital Penetration

Sania Khan (2023) investigated how rural consumers' behavior changed in the digital economy. According to her research, rural consumers—particularly those in Tier III and IV towns—are increasingly using online platforms for both necessary and optional purchases. This change has been greatly influenced by elements like rising smartphone adoption, the use of digital payments (via UPI), and government programs like Digital India.

3- Women's Empowerment and E-Commerce in Rural India

The Economic Times (2023) reported that over 9 million women, primarily from rural and semi-urban areas, have become micro-entrepreneurs by reselling things online, highlighting the impact of social-commerce platforms like Meesho. In addition to raising household incomes, this social-commerce model has increased rural women's digital engagement and economic decision-making.

4- Rural Karnataka: Case-Based Perspectives

Small producers and retailers in Karnataka's Chitradurga area have adapted to the e-commerce ecosystem, according to a local study by Shiva Kumar and Pasha (2024). They discovered that after onboarding digital platforms, demand for informal businesses—such as home-based food processing units and handcraft artisans—rose. The study also identifies issues with digital compliance, packaging regulations, and logistics that continue to impede scaling.

5- Infrastructure and Policy Issues

In her study on rural digital ecosystems, Bhatia-Kalluri (2021) emphasizes how local digital infrastructure, community networks, and legislative frameworks influence how rural business owners use e-commerce. In order to fully realize the potential of rural e-commerce, her work emphasizes the necessity of region-specific interventions, such as focused digital skill development programs, localized logistics, and vernacular support systems.

6- Market Transformation and Government Initiatives

Initiatives under the Startup India and Digital India missions have greatly expedited the digital transformation of rural markets, according to reports from IBEF (2024). Common Service Centers (CSCs), which function as rural digital hubs enabling services like e-retailing, online bill paying, and banking, receive particular emphasis. These facilities are essential for fostering trust and last-mile connectivity among rural customers.

Statement Of The Problem:

The principles of inclusive growth, digital transformation, rural empowerment, and economic self-reliance are central to India's vision of Viksit Bharat, or Developed India. By increasing market access, creating jobs, encouraging entrepreneurship, and connecting rural economies with domestic and international markets, electronic retailing, or e-retailing, has become a potent instrument for economic growth. However, rural participation—particularly among rural youth—remains unequal and underutilized despite India's digital economy's tremendous rise.

One important demographic group that has the ability to spur innovation, digital adoption, and cooperative enterprise in rural areas is young people living in rural areas. By facilitating shared logistics, digital literacy, collective marketing, and enhanced bargaining power, collaboration among rural youth through self-help groups, cooperatives, startups, and digital collectives can bolster e-retailing. However, obstacles include low digital skills, poor infrastructure, ignorance, lack of funds, lackluster institutional support, and socioeconomic restrictions impede their ability to effectively engage in online shopping. Not enough is known about how rural youth working together can improve their e-retailing activities and support Viksit Bharat's overarching objective. Furthermore, little is known about the ways in which collaboration affects income production, digital inclusion, economic empowerment, and sustainable rural development. Therefore, the main issue this study attempts to answer is how rural youth cooperation may help to promote electronic retailing and how this cooperation can help to achieve the goal of Viksit Bharat through inclusive rural economic growth.

Objectives of The Study:

1. To study the level of awareness and participation of rural youth in electronic retailing activities.
2. To analyze the forms of cooperation (such as self-help groups, cooperatives, youth associations, startups, and digital collectives) adopted by rural youth in e-retailing.
3. To assess the impact of cooperative efforts on income generation, employment opportunities, and entrepreneurship development among rural youth.
4. To examine the role of digital literacy, infrastructure, and government support in strengthening cooperative e-retailing initiatives in rural areas.
5. To identify the challenges faced by rural youth in cooperative electronic retailing.
6. To evaluate how cooperative participation in e-retailing contributes to rural economic development and the broader goal of Viksit Bharat.
7. To suggest measures and policy recommendations to enhance the effectiveness of cooperation among rural youth in electronic retailing.

Viksit Bharat 2047's goals-

The main objective of Viksit Bharat is to make India a developed country by 2047 by enabling all citizens to participate in the economy. In just 20 years, it seeks to grow India's economy to \$30 trillion. In previous Union Budgets, the following actions were declared in support of the Viksit Bharat 2047 vision:

- 1- **Income Tax Reforms:** The government increased the personal income tax exemption ceiling from ₹8 lakh to ₹12 lakh in order to boost domestic demand and quicken economic growth. Savings, investments, and household consumption would all rise as a result.
- 2- **Agricultural Development:** To increase agricultural output, a high-yield crop program that will help 17 million farmers has been introduced. The budget suggests expanding sustainable farming methods and giving farmers more subsidized loans.
- 3- **Support for Startups and MSMEs:** Through improved credit guarantee programs, the budget aims to increase financing for startups and Micro, Small, and Medium Businesses (MSMEs). This program seeks to promote entrepreneurship and innovation in order to boost the economy.

- 4- **Infrastructure Investment:** To build infrastructure, boost the economy, and generate employment, the government intends to slightly raise capital expenditures. To enable long-term growth, this involves investments in digital infrastructure, energy, and transportation.

Viksit Bharat 2047: Vision, Purpose, and Significance

The Viksit Bharat 2047 initiative seeks to evolve India as a developed nation by its centenary of independence, in 2047.

1- No Poverty

A multifaceted strategy for empowering the poor and fostering inclusive growth will enable Viksit Bharat 2047 to achieve zero poverty.

Meanwhile, more than 80 crore Indians continue to benefit from food security programs. The largest scheme in the world, the Jan Dhan Yojana, has enabled financial empowerment for crores of people by giving them access to banking.

Through specialized support structures, special attention is paid to empowering Divyangs (divyangjan), safeguarding the rights of marginalized groups, and realizing ambitions. By giving more than three crore rural impoverished people affordable housing with adequate amenities, tribal development is given priority and improves their quality of life.

2- Welfare of Farmers

Crop loss risk is mitigated and financial stability is guaranteed by a number of programs, including PM KISAN, Pradhan Mantri Fasal Bima Yojana, and Soil Health Cards, which help millions of farmers.

The government has also placed a strong emphasis on developing agricultural infrastructure with a Rs. 1 lakh crore financial facility and irrigation facilities through the PM Krishi Sinchayee Yojana. Better resources, more credit availability, and improved titles are all intended to strengthen farmers through programs like the Agriculture Infrastructure Fund, Kisan Credit Cards, and SVAMITVA. The PM-PRANAM program advances the goal of a thriving, independent agriculture sector by encouraging organic cultivation and sustainable fertilizer use.

3- Empowerment of Women

Women's leadership is being promoted by the Nari Shakti Vandan Adhiniyam, which guarantees quotas to SC and ST women, and the reservation of 33% of seats in the Lok Sabha and state assemblies.

The rights and security of Muslim women have improved since triple talaq was made a crime. More than 28 crore women have opened Jan Dhan accounts as a result of financial inclusion initiatives, and women make up the majority of PM Mudra Yojana and Stand Up India beneficiaries. A more inclusive and empowered Indian women's culture is also fostered by programs like the Jal Jeevan Mission, Swachh Bharat Mission, and expanded maternity benefits under PMMVY.

4- Learning

Twelve institutions have been designated as Institutions of Eminence, and the first installment of approximately Rs. 630 crores has been distributed to the selected PM SHRI schools. Programs like Nipun Bharat, Vidyanjali Mentoring, and Nishtha Teachers' Holistic Education place a strong focus on credit-based learning, flexible curricula, and basic reading. Millions of people have been upskilled by the PM Kaushal Vikas Yojana and the Skill India Mission, and SAMARTH Udyog Centers are preparing the workforce for Industry 4.0. Over 10,000 Atal Tinkering Labs across the country foster a scientific temperament, and Manipur's establishment of the first National Sports University is a significant accomplishment. With the opening of IIT campuses in Zanzibar and Abu Dhabi, internationalization of higher education is underway, aided by initiatives like the Start Up India Fund Scheme and the Fund of Funds.

5- Enhancements for the Middle Class

While SBM Gramin and its Phase II have improved sanitation through extensive toilet construction and women-led waste management, PM Awas Yojana (Gramin) has supplied over 2.5 crore homes. Green areas and improved water and sewer connections have been made possible by urban projects like AMRUT, while tap water is now available to all rural households thanks to Har Ghar Jal. Economic stability is further encouraged by the Rozgar Mela drive, which has attracted 5.5 million new EPFO subscribers and is working to create 10 lakh jobs.

6- Medical Care

With millions of registered health accounts and hundreds of health centers, the PM-Ayushman Bharat Health Infrastructure Mission and Digital Mission are bolstering digital connection and public healthcare.

Programs like PM Jan Aushadhi Yojana and e-Sanjeevani OPD improve the availability and cost of high-quality medical treatment and medications.

A sustainable healthcare ecosystem is emerging in India as a result of initiatives in organ donation and drug-dependent rehabilitation through the Child Health and Nutrition Mission Indradhanush and the Nasha Mukta Bharat Abhiyaan.

7- Security of the Nation

The introduction of locally produced Light Combat Helicopters and the innovative Agnipath program, which modernizes the armed forces with youthful, high-tech soldiers, speak to the nation's strong defense capabilities.

India's counterterrorism efforts have been successful, as seen by the dramatic decline in insurgent occurrences and the successful execution of surgical strikes. In addition, Article 370 was repealed, and development projects in Jammu & Kashmir and Ladakh were expedited; the latter brought stability and prosperity to the areas.

8- Development of the Economy

The introduction of the GST has brought the market together, while digital projects like UPI and Aadhaar-DBT have transformed payments.

The Government e-Marketplace has improved efficiency, while the MSME sector's reforms under PM MUDRA, Startup India, and PM Jan Dhan Yojana have increased employment and financial inclusion.

9- Infrastructure

With the help of programs like PM Gati Shakti, India's infrastructure has grown, improving the lives of its residents and facilitating the movement of products and services as well as creating jobs. India's road, railway, air, and waterway networks have grown, and its engineering prowess has been demonstrated by projects like the Vande Bharat Express and the Yashobhoomi Convention Centre. The general populace may now afford to travel by air thanks to the UDAN plan.

10- Technology

India demonstrated its cost-effectiveness in space by becoming the first nation to reach the Moon's South Pole through projects like Chandrayaan-3.

The Gaganyaan mission will shortly launch Indian astronauts into space, while the Aditya-L1 mission will study the Sun.

Through initiatives like UMANG and KisanRath, India is revolutionizing governance and service delivery, and the Pradhan Mantri Gramin Digital Saksharta Abhiyan has equipped over 4.6 crore people with digital skills.

11- Sustainability

In terms of installed renewable energy capacity, India is currently the fourth largest in the world. Solar capacity is increasing at an exponential rate, and a record low solar tariff of Rs. 1.99 per unit has been reached.

Around the world, the Global Biofuel Alliance is setting the standard for the use of sustainable biofuels.

By turning agricultural waste into compost and biogas, the GOBARdhan program promotes waste-to-energy alternatives.

India is providing solar energy solutions to farmers through the PM-KUSUM program. Simultaneously, the One Sun, One World, One system project aims to create a global solar energy system, promoting sustainable development globally.

Role of Cooperation of Rural Youth –

By encouraging entrepreneurship, using contemporary agricultural technology, and establishing social capital, young collaboration in rural areas is essential to the transformation of rural economies. They improve livelihoods, guarantee food security, promote sustainable development, and serve as catalysts for rural modernization through clubs, cooperative societies, and youth-led initiatives.

- 1- **Agricultural Modernization & Innovation:** In order to boost productivity, young people in rural areas are embracing new technologies like artificial intelligence (AI) and machine learning as well as diversifying farming methods.
- 2- **Job Creation & Entrepreneurship:** Cooperative youth are creating jobs in marketing, processing, logistics, and agribusiness.
- 3- **Resource Sharing & Lower Costs:** Young farmers can greatly lower their production costs by sharing tools and machines through cooperative efforts.
- 4- **Enhancing Community & Social Capital:** Cooperatives and youth groups (Yuvaka Mandals) promote social cohesiveness and cooperation among communities.
- 5- **Financial Inclusion:** They make it easier for small-scale agricultural initiatives to obtain credit and microfinance, enabling operations to grow.
- 6- **Empowerment & Skill Development:** Cooperatives help close the skill gap in agriculture by offering resources and training that empower young people.

Electronic Retailing –

Selling products or services to customers directly online rather than through a physical store is known as electronic retailing, or e-retailing. Businesses employ websites, smartphone applications, or online marketplaces to reach clients in this type of electronic commerce, or e-commerce.

Characteristics of E-Retailing, or Electronic Retailing -

1- Online Storefront

Mobile apps or websites (like Amazon) are used to display products.

2- Available at all times

Consumers are not limited by time and can shop whenever they want.

3- Broad Selection of Products

Without being constrained by physical area, e-retailers are able to provide a wide range of products.

4- Options for Digital Payments

A variety of payment options, including cash on delivery, digital wallets, UPI, net banking, and credit/debit cards.

5- Delivery Service to Your Home

The customer's address is where the products are delivered.

6- Search and Filter Features

Searching, comparing, and filtering products by price, brand, ratings, and other factors is simple for customers.

7- Consumer Evaluations and Scores

Before making a purchase, customers can read and leave reviews.

8- Customization

suggestions based on past purchases and browsing activity.

9- Monitoring Orders

Real-time shipping status tracking is available to customers.

10- Reduced Operating Expenses

Large physical storefronts are not necessary, which lowers overhead costs.

Conclusion – In conclusion, rural youth collaboration and active engagement are essential to realizing the Viksit Bharat 2047 vision through e-commerce. Young people from rural areas are vivacious, tech-savvy, and able to connect traditional rural marketplaces with contemporary internet platforms.

- Rural youth who participate in e-retailing can:
 - Encourage the sale of regional and agricultural goods in both domestic and international markets.
 - Encourage self-employment and lower unemployment in rural areas.
 - Encourage efforts in Digital India
 - Boost startups and entrepreneurship in rural areas
 - Raising income levels and raising quality of living

Their collaboration in creating cooperatives, digital businesses, and self-help groups promotes sustainable development and group growth. Rural youth may turn communities into hubs of economic power if they have access to internet infrastructure, government assistance, digital literacy training, and other resources.

As a result, rural youth collaboration in electronic retailing serves as a solid basis for creating an independent and developed India by 2047, in addition to serving as a means of fostering individual and collective growth.

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Green Practices and Its Impact on ESG Performance: A Study of IT Organizations in the Pune Region

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Abstract

Sustainability has emerged as a critical component of business policy, particularly in the technology sector. This research paper explores the association in between the acceptance of green practices and ESG (Environmental, Social, and Governance) performance among IT organizations situated in Pune Region, India. The paper reflects the scope of green practices like waste management, employee awareness, green IT, energy efficiency etc and measures their impact on ESG parameters. Through a diverse approach comprising surveys and qualitative interviews of the employees working in IT organizations in Pune Region the study measures how the implementation of waste management systems, green IT practices & energy efficient operations influence ESG. The findings of the study suggest that, green practices have a constructive and statistically substantial result on the environmental component of ESG, and indirectly on overall ESG performance. The paper provides strategic recommendations for IT organizations in Pune region to improve adoption and implementation of sustainable green practice so that it strengthens ESG results and stakeholder value.

Keywords: Green Practices, ESG Performance, IT Organizations, Green IT, Pune Region.

1. Introduction

1.1 Introduction of the Study

In developing country like India, the IT business has been at the front of adopting sustainability measures due to rising regulatory expectations, stakeholder burden, and CSR goals. The appearance of the Environmental, Social, and Governance (ESG) framework has shifted the attention of businesses from short term profitability to long term sustainability. The Pune region known for its solid concentration of IT parks such as Kharadi, Hinjawadi and Magarpatta offers a representative sample for studying how IT organizations integrate green practices into their daily operations.

Green practices, includes waste management, renewable energy usage, e-waste recycling, smart building design etc are now seen as both environmental necessities and competitive differentiators. Notwithstanding awareness, implementation varies widely. Therefore, this study investigates the extent and impact of green practices on ESG performance, with a specific emphasis on IT organizations in the Pune region.

In recent years, stakeholders such as investors, regulators, customers and employees have gradually emphasised non-financial performance dimensions, especially through the Environmental, Social and Governance (ESG) parameters. The IT organizations, although less carbon intensive than other heavy manufacturing industries, still has substantial environmental and social impacts like energy use, e-waste, employee welfare, supply chain issues. Additionally, in country like India, and particularly in emerging technology hubs like the Pune region, IT organizations are under rising pressure to adopt and implement sustainable practices and showcase ESG governance.

Pune is one of the fast growing & leading IT hubs in India after Bangluru and Hyderabad. In the Pune region, where many IT organizations operate across campuses and office parks, the adoption of green practices may vary significantly. This study emphasises on how those green practices render into measurable developments in ESG performance, and recognizes which practices matter greatest.

1. 2 Scope of the Study

- This Study is restricted to IT organizations located in Pune Region which include Pune City, Hinjawadi, Pimpri-Chinchwad, Magarpatta, and Kharadi.
- This study Focus on adoption and implementation of Green Practices such as energy efficiency, green IT, waste management, water conservation, green building initiatives.
- For this study Data collected from IT organizations for the financial year 2024–2025.
- The study is limited to respondents which are ready to share their ESG related data.

1. 3 Objectives of the Study

1. To find and categorize green practices implemented by IT organizations in Pune region.
2. To evaluate the level of adoption of green practices implemented by IT organizations in Pune region.
3. To measure ESG performance indicators of selected IT organizations.
4. To analyse the relationship between green practices and ESG performance.

1. 4 Hypotheses of the Study

- **H₁:** There is a significant positive relationship between adoption of green practices and ESG performance in IT organizations.
- **H₀:** There is no significant relationship between adoption of green practices and ESG performance in IT organizations.

Sub-hypotheses:

- **H_{1a}:** Green practices significantly influence the environmental dimension of ESG.
- **H_{1b}:** Green practices significantly influence the social dimension of ESG.
- **H_{1c}:** Green practices significantly influence the governance dimension of ESG.

2. Literature Review

2.1 Green Practices in the IT organizations

Green practices refer to operational, structural and managerial activities that organizations start to reduce environmental impact, improve resource efficiency and embed sustainability into their operations. In the context of information technology (IT), these typically include green computing like energy-efficient hardware, server consolidation, virtualization), green infrastructure like green buildings, renewable energy sourcing, waste and e-waste management, water preservation, procurement of eco-friendly equipment, and employee awareness programmes.

In their review related to Green IT implementation, Green Information Technology as administrative innovation - Organizational factors for successful implementation (Zaman & Sedera, 2016) identified that although awareness of Green IT is rising, actual acceptance remains restricted, and organizational/institutional barriers such as lack of incentives, weak leadership, low employee engagement etc inhibit progress.

More recently, Sustainable IT Services: Advancing the Impact of Green Computing Practices (Saxena, Tandon & Tiwari, 2025) highlight the growing energy demand of data centres and cloud operations, and recommend that green computing should be integrated into IT services as a sustainability.

In the Indian context, studies show that major IT organizations have started implementing green practices: for example, Tata Consultancy Services (TCS) is reported to use ISO 14001-certified Environmental Management Systems, solar lighting and energy-efficient appliances in offices. Additionally, some survey shows that Indian IT companies are organising green awareness campaigns and embedding green practices as “mandated” initiatives.

2.2 Green Practices in IT Organizations from Pune Region

Research specific to the Pune region an important IT hub in Western India delivers more tailored perception. A research paper entitled A Critical Study of Green Practices Adopted by IT Organizations in Pune Region: Literature Review (Lohiya & Khedkar, 2025) focuses on IT organizations in Pune and

summarises green practices adoption, concluding that awareness is reasonably high but implementation depth is uneven.

Another study which is published in The Online Journal of Distance Education and e-Learning, Vol.11 Issue 2 they have surveyed about 500 respondents among IT organizations in and around Pune and found high awareness among both top management and employees, but large variations in actual implementation of green management practices such as ISO 14001 certification, e-waste management systems, and energy usage monitoring.

2.3 ESG (Environmental, Social, Governance) Performance and Its Link to Green Practices

The concept of ESG (Environmental, Social, Governance) has increased importance as a way for investors, regulators, and companies to assess non-financial aspects of corporate performance. Environmental practices (E) assess resource use, emissions, waste, climate risk; Social parameter (S) covers employee welfare, community relations, diversity where Governance practices (G) covers board oversight, ethics, transparency.

A recent systematic review, Environmental Social Governance (ESG) Practices: A Systematic Literature Review (Sabirali, 2024) explored ESG literature, and found that while research on ESG has grown, the relation between specific green practices and measurable ESG results remains under-explored.

In the Indian corporate environment context, the research paper by Corporate Sustainability in India: ESG Practices, Net-Zero Strategies, and the Path to a Green Economy (Sharma et al., 2024) analyses Indian companies' ESG practices, net-zero strategies, and identifies that regulatory push such as by Securities and Exchange Board of India – SEBI, stakeholder pressure, and global capital flows are driving ESG adoption. They emphasise that “E” dimension is relatively more advanced than “S” and “G” in several Indian organizations.

From a performance and risk perspective, the study by Linking ESG Disclosure to Firm Performance and Risk: An International Perspective (Dayal, Soni & Aggarwal, 2024) using a panel of 1,973 companies across settled & developing markets found that ESG disclosure and performance have a non-linear relationship with firm performance initial costs may weigh, but long-term benefits exist; and regional/industry-specific variations matter.

2.4 Linking Green Practices with ESG Performance: Evidence and Gaps

Study discovering the connection between green practices especially in IT organizations and ESG results is relatively limited, but growing. The organizational factors literature (Zaman & Sedera, 2016) suggests that green IT adoption can contribute to the environmental component of ESG, yet social and governance linkages are not as clearly expressed.

In the Indian IT segment, a study on Green Human Resource Management (GHRM) in IT companies in Chennai found a strong positive correlation between GHRM initiatives and reduction in carbon footprint this recommends a way from green practices to the “E” dimension of ESG.

3. Research Methodology

3.1 Research Design

This study adopts a descriptive and analytical research design.

The descriptive aspect attentions on understanding the degree of adoption of Green Practices in IT organizations in the Pune region whereas analytical part observes the impact of these practices on ESG performance indicators.

The study adopts a quantitative research method supported by primary data i.e. survey responses from IT professionals in Pune region and secondary data like company sustainability reports, ESG disclosures and other published databases.

3.2 Research Approach

A mixed-method approach is used to ensure comprehensive insights:

- Quantitative Approach – with the help of structured questionnaires given to IT employees and managers to collect measurable data on green practices and ESG outcomes.

- Qualitative Approach – with the help of document analysis of corporate sustainability and ESG reports for relative understanding.

3.3 Research Area and Population

- The geographical focus of this study is the Pune Metropolitan Region, which includes key IT Parks such as Hinjewadi, Kharadi, Magarpatta, Baner, Yerwada and Hadapsar.
- The target population includes employees, sustainability officers, and management representatives working in IT and IT-enabled service organizations in this region.
- These include large multinational companies such as Infosys, TCS, Tech Mahindra, Cognizant, Wipro etc and medium-sized local IT organizations as well.

3.4 Sampling Design

- **Sampling Technique:** Stratified random sampling is used to ensure representation across small, medium, and large IT organizations.
- **Sampling Unit:** Individual IT professionals and organizational sustainability officers in Pune-based organizations.
- **Sample Size:** 200 respondents.
- **Strata:**
 - Large IT organizations (more than 1000 employees)
 - Medium IT organizations (100–999 employees)
 - Small IT organizations/startups (less than 100 employees)

This stratification confirms that the study captures variations in green practices based on organizational size and resource capability.

3.5 Data Sources

3.5.1 Primary Data: Collected through a structured questionnaire designed to measure:

- Extent of green practices such as energy conservation, waste management, green IT, employee awareness, sustainability reporting etc.
- Perceptions of impact on ESG performance.
- Organizational support and challenges faced in implementation.

The questionnaire uses a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

3.5.2 Secondary Data: The secondary data is Collected from:

- Annual sustainability and ESG reports of IT companies like Infosys, TCS, Wipro etc.
- SEBI's Business Responsibility and Sustainability Reports (BRSR).
- Scholarly journals, published research papers, and online databases.
- Environmental audit reports from government or industry bodies like NASSCOM, MIDC.

3.6 Research Instrument

The research instrument is a structured questionnaire divided into the below 4 sections:

- **Demographic Profile:** Company name (elective), employee designation, experience, department, company size.
- **Green Practices:** 6 statements covering energy efficiency, waste management, recycling, carbon reduction, green procurement, and awareness programs.
- **ESG Performance:** 10 statements assessing environmental results (E), social results (S), and governance mechanisms (G).
- **Perceived Impact:** 10 Questions linking adoption of green practices to business performance, employee satisfaction, and stakeholder reputation.

Reliability of the instrument is tested using Cronbach's Alpha ($\alpha \geq 0.70$) to ensure internal consistency.

3.7 Variables of the Study

3.7.1 Independent Variable:

- **Green Practices** measured through indicators such as energy efficiency, waste management, green IT, renewable energy use, and employee participation.

3.7.2 Dependent Variable:

- **ESG Performance** measured through environmental performance, social responsibility, and governance effectiveness.

3.7.3 Control Variables:

- Organization size
- Years of establishment
- Employee position or role

3.8 Hypotheses of the Study : The study tests the following hypotheses:

- **H₁:** There is a significant positive relationship between adoption of green practices and ESG performance in IT organizations.
- **H₀:** There is no significant relationship between adoption of green practices and ESG performance in IT organizations.

Sub-hypotheses:

- **H_{1a}:** Green practices significantly influence the environmental dimension of ESG.
- **H_{1b}:** Green practices significantly influence the social dimension of ESG.
- **H_{1c}:** Green practices significantly influence the governance dimension of ESG.

3.9 Tools for Data Analysis

Quantitative data is analysed using SPSS / Excel with the following statistical techniques:

- **Descriptive Statistics:** Mean, Standard Deviation, Frequency, and Percentage Analysis.
- **Reliability Analysis:** Cronbach's Alpha for internal consistency.
- **Correlation Analysis:** Pearson correlation to test the strength and direction of relationships between green practices and ESG performance.
- **Regression Analysis:** To determine the extent of impact of green practices on ESG dimensions.
- **ANOVA / t-tests:** To examine significant differences in practices across firm sizes.

3.10 Ethical Considerations

- Involvement in this research is voluntary; all respondents are informed about purpose of study i.e. academic purpose.
- Confidentiality and anonymity of respondents and their organizations are maintained.
- Data is used solely for academic and research purposes, with informed consent obtained from participants.
- Secondary data is cited appropriately to avoid plagiarism.

3.11 Limitations of the Study

- Study restricted to IT organizations within Pune region. The findings of this research may not fully generalise to other Indian IT hubs/parks.
- Self-reported information may contain perceptual bias.
- Cross-sectional design may not capture long-term ESG performance effects.

4. Data Analysis and Interpretation

4.1 Overview of Data Collection

A total of 200 structured questionnaires were distributed among IT employees and sustainability officers from small, medium, and large IT organizations in the Pune region (Hinjewadi, Magarpatta, Kharadi, Baner, and Yerwada IT parks).

Out of these, 182 valid responses were received (91% response rate), which formed the basis of the analysis.

4.2 Demographic Profile of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	112	61.5
	Female	70	38.5
Age	21–30 years	68	37.4
	31–40 years	80	44.0
	41 years & above	34	18.6
Designation	Associate / Analyst	66	36.3
	Manager / Team Lead	74	40.7
	Senior Management	42	23.0
Type of Organization	Large IT firm (>1000 employees)	92	50.5
	Medium IT firm (100–999 employees)	58	31.9
	Small IT firm (<100 employees)	32	17.6

Table 1: - Profile of Respondents

Interpretation:

From above it is found that, Maximum respondents belong to mid-career age groups which are working in large IT organizations. This study gives the balanced coverage across different employee levels.

4.3 Reliability Analysis

Construct	No. of Items	Cronbach's Alpha (α)	Interpretation
Green Practices	10	0.874	Highly reliable
ESG – Environmental	5	0.812	Reliable
ESG – Social	5	0.796	Acceptable
ESG – Governance	4	0.804	Reliable

Table 2: - Reliability Analysis

Interpretation:

All Cronbach's Alpha values exceed 0.70 which indicates good internal consistency among scale items used in the questionnaire.

4.4 Descriptive Statistics on Green Practices

Statement	Mean	Std. Dev.	Interpretation
Organization uses energy-efficient lighting/equipment	4.28	0.64	Strongly Implemented
E-waste is properly segregated and recycled	4.02	0.72	Implemented
Regular environmental training and awareness sessions	3.74	0.81	Moderate
Adoption of green procurement (eco-friendly suppliers)	3.62	0.86	Moderate
Use of renewable energy or solar panels	3.49	0.92	Moderate
Digitalisation and paperless processes	4.33	0.55	Highly implemented

Table 3: - Descriptive Statistics on Green Practices

Interpretation:

IT organizations in Pune region show strong adoption of energy efficiency and paperless operations but relatively lower implementation of renewable energy and green procurement practices.

4.5 ESG Performance Perception

ESG Dimension	Mean Score	Std. Dev.	Interpretation
Environmental (E)	4.12	0.67	High performance
Social (S)	3.91	0.72	Moderate to high performance
Governance (G)	3.76	0.79	Moderate performance
Overall ESG Score (Composite)	3.93	0.73	Moderately high ESG performance

Table 4: - ESG Performance Perception

Interpretation:

The “Environmental” dimension of ESG shows the highest mean, aligning with the focus of green practices, while “Governance” shows moderate levels, suggesting room for improvement in transparency and policy frameworks.

4.6 Correlation Analysis

Variables	Green Practices	ESG Performance
Green Practices	1	0.711**
ESG Performance	0.711**	1

(p < 0.01)

Table 5: - Correlation Analysis between variables**Interpretation:**

There is a strong positive correlation ($r = 0.711$) between adoption of green practices and ESG performance. This indicates that organizations with better green initiatives also demonstrate stronger ESG results.

4.7 Regression Analysis

Model Summary		R	R ²	Adjusted R ²	Std. Error
Green Practices → ESG Performance		0.711	0.505	0.498	0.511
Coefficients (β)	Unstandardised B	Std. Error	t-value	Sig. (p)	
Constant	1.21	0.187	6.47	0.000	
Green Practices	0.682	0.054	12.63	0.000	

Table 6: - Regression Analysis**Interpretation:**

The regression model explains 50.5% of the variation in ESG performance, meaning that green practices significantly predict ESG results ($p < 0.001$).

The regression equation derived is:

$$\text{ESG Performance} = 1.21 + 0.682 (\text{Green Practices})$$

Hence, a one-unit increase in green practice implementation leads to a 0.68 increase in ESG performance score.

4.8 ANOVA – Firm Size and ESG Performance

Firm Type	Mean ESG Score	F-Value	p-value
Large IT Organizations	4.12	5.784	0.004
Medium IT Organizations	3.89		
Small IT Organizations	3.56		

Table 7: - ANOVA – Firm Size and ESG Performance**Interpretation:**

The ANOVA test shows a significant difference ($p < 0.01$) among IT organizations of different sizes, with large IT organizations exhibiting higher ESG performance due to better resources and structured sustainability policies.

4.9 Hypothesis Testing

Hypothesis	Result	Interpretation
H ₁ : Green practices significantly impact ESG performance	Accepted	Significant positive relationship
H _{1a} : Green practices influence Environmental dimension	Accepted	Strong positive effect ($\beta = 0.74$, $p < 0.001$)
H _{1b} : Green practices influence social dimension	Accepted	Moderate positive effect ($\beta = 0.58$, $p < 0.01$)
H _{1c} : Green practices influence Governance dimension	Partially Accepted	Weak positive effect ($\beta = 0.46$, $p < 0.05$)

Table 8: - Summary shows Hypothesis Testing

Interpretation:

The results support all primary hypotheses. Green practices most strongly influence Environmental results, moderately affect social factors, and somewhat improve Governance mechanisms.

4.10 Qualitative Insights

Interviews with sustainability officers revealed that:

- Companies with ISO 14001 certification or LEED-certified buildings perform better in ESG audits.
- Employee awareness programs (e.g., “Green Week”, “No Paper Days”) have improved social participation in sustainability.
- The biggest challenges include initial investment cost, measurement difficulties, and low management involvement in small organizations.

4.11 Interpretation Summary

- The IT industry in Pune shows mature awareness and progressive adoption of green practices.
- There exists a direct, statistically significant relationship between green practices and ESG performance ($r = 0.711$, $p < 0.01$).
- Large IT organizations outperform smaller ones due to structured sustainability frameworks and global reporting standards.
- The Environmental dimension is most improved by green practices, followed by Social and Governance dimensions.
- The study validates that green operational practices can enhance ESG performance, thereby contributing to both corporate image and long-term sustainability.

5. Findings / Results

The results of this study provide a comprehensive view of the adoption of green practices by IT organizations in Pune and their impact on ESG performance.

5.1 Adoption of Green Practices

- IT organizations in Pune show strong implementation of energy-efficient equipment and paperless processes, with mean scores of 4.28 and 4.33, respectively.
- Practices such as renewable energy adoption (mean = 3.49) and green procurement (mean = 3.62) are moderately implemented, indicating room for improvement.
- Environmental training and awareness programs also scored moderately (mean = 3.74), suggesting that employee engagement in sustainability can be enhanced further.

5.2 ESG Performance

- The Environmental dimension of ESG has the highest mean score (4.12), reflecting the strong adoption of green practices in resource efficiency and waste management.
- The Social dimension has a mean of 3.91, indicating moderate levels of employee and community engagement in sustainability efforts.
- The Governance dimension shows the lowest mean (3.76), suggesting the need for stronger policies, reporting mechanisms, and transparency measures.

5.3 Correlation Between Green Practices and ESG Performance

- A strong positive correlation ($r = 0.711$, $p < 0.01$) exists between green practices and overall ESG performance.
- This indicates that higher adoption of green practices is associated with better ESG results across environmental, social, and governance dimensions.

5.4 Regression Analysis

- Regression results confirm that green practices significantly predict ESG performance ($R^2 = 0.505$), with the regression equation:
 - $\text{ESG Performance} = 1.21 + 0.682 \times \text{Green Practices}$

- This implies that for every one-unit increase in green practice implementation, ESG performance increases by 0.682 units.

5.5 Effect of Firm Size on ESG Performance

- ANOVA results reveal a significant difference ($p = 0.004$) in ESG performance across different IT firm sizes.
- Large IT organizations exhibit the highest ESG performance (mean = 4.12), followed by medium (3.89) and small organizations (3.56).

The study demonstrates that adoption of green practices in Pune-based IT organizations significantly improves ESG performance, enhancing environmental results, social responsibility, and to a lesser extent, governance standards. The results validate the importance of sustainability strategies in corporate IT operations and provide actionable insights for managers aiming to improve ESG performance.

6. Conclusions

The present study, “Green Practices and Its Impact on ESG Performance: A Study of IT Organizations in the Pune Region”, aimed to examine the adoption of green practices in IT organizations and their effect on Environmental, Social, and Governance (ESG) performance. The research findings provide several important conclusions:

6.1 Green Practices are Positively Adopted:

IT organizations in Pune demonstrate a strong focus on energy efficiency and paperless operations, reflecting a commitment to operational sustainability. However, practices such as renewable energy adoption and green procurement are moderately implemented, indicating opportunities for further improvement.

6.2 Significant Impact on ESG Performance:

The study suborganizations a strong positive relationship ($r = 0.711$, $p < 0.01$) between green practices and ESG performance. Regression analysis shows that green initiatives can explain over 50% of the variance in ESG performance ($R^2 = 0.505$). This validates the hypothesis that sustainability practices significantly enhance corporate ESG results.

6.3 Environmental Results Most Influenced:

Among the three ESG dimensions, environmental performance benefits the most from green practices, followed by social results. Governance, while positively influenced, shows moderate improvement, suggesting the need for enhanced policies, compliance mechanisms, and transparency initiatives.

6.4 Firm Size Matters:

Larger IT organizations perform better in ESG metrics compared to medium and small organizations. This is attributed to greater resource availability, structured sustainability frameworks, and dedicated ESG teams in large organizations.

Implications for Management and Policy:

- IT organizations should strengthen investment in renewable energy, green procurement, and employee awareness programs to further enhance ESG performance.
- Governance mechanisms such as sustainability reporting, audits, and compliance policies should be institutionalized to complement environmental and social initiatives.
- Small and medium IT organizations can benefit from benchmarking against larger organizations and adopting scalable green strategies.

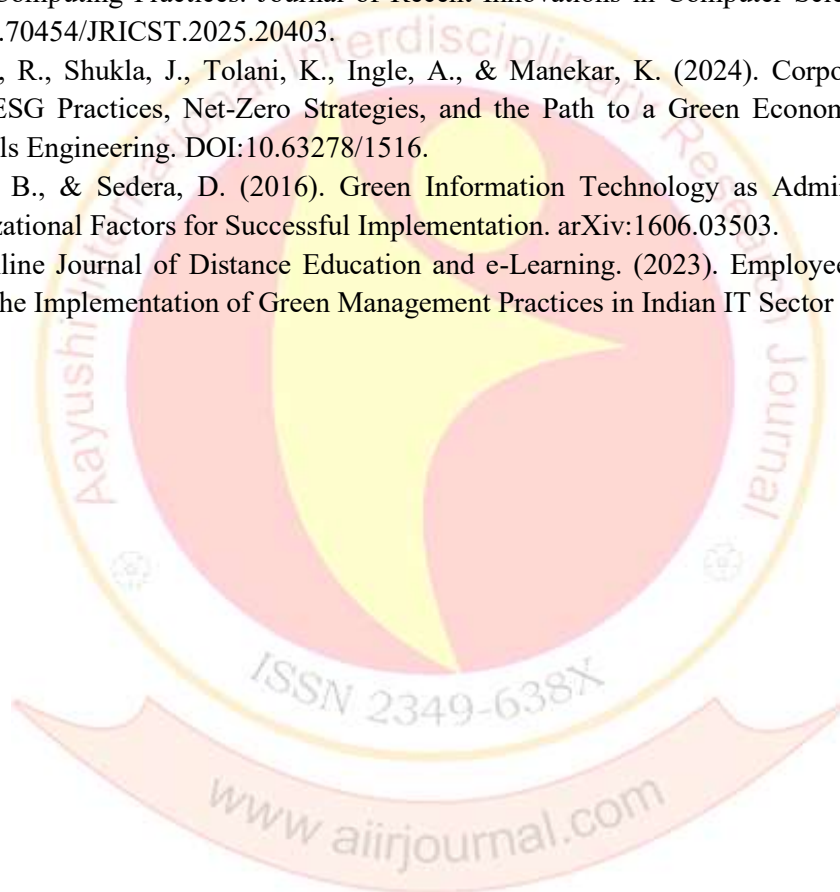
7. Contribution to Knowledge:

This research adds empirical evidence on the relationship between green practices and ESG performance within the context of Pune-based IT organizations, filling a research gap in regional IT sustainability practices. It highlights that proactive environmental measures not only improve ESG scores but also contribute to organizational reputation, employee engagement, and long-term competitiveness.

The study concludes that green practices are a crucial driver of ESG performance in IT organizations. Organizations that integrate sustainability into their operations and corporate culture are better positioned to achieve environmental responsibility, social accountability, and governance excellence. Hence, promoting green initiatives is both a strategic necessity and a pathway to sustainable business growth in the Pune IT sector.

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Role of Human Resource Development in Viksit Bharat**Smt. Chavan M. M.**

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Abstract

*Human resource development (HRD) is crucial to achieving *Viksit Bharat* (Developed India) by developing a workforce that is informed, efficient, and adaptable. This study examines the role that HRD plays in fostering innovation, social transformation, and inclusive economic growth. It highlights how education, training, skill development, and capacity-building initiatives enhance human capital and employability. The report emphasizes how crucial it is to match HRD policies with national initiatives like Digital India, Skill India, and Atmanirbhar Bharat in order to satisfy the demands of a rapidly evolving global economy. Through promoting moral leadership, technological competence, and lifelong learning, HRD promotes sustainable development and global competitiveness. The report offers strategic suggestions for strengthening HRD frameworks in addition to addressing implementation challenges, regional variations, and talent shortages. All things considered, effective HRD is essential to empowering individuals and realizing the long-term objective of a robust and developed India.*

Keywords

Human Resource Development, Viksit Bharat, Skill Development, Education, Workforce Productivity, Inclusive Growth

Introduction

Within the framework of India's vision of Viksit Bharat (Developed India), which aims to create a knowledge-driven, self-sufficient, and inclusive economy where human capital is equipped with the values, abilities, and skills needed to tackle the challenges of the twenty-first century, human resource development, or HRD, is an important factor in determining a country's socioeconomic development.

India has both potential and problems, since it has one of the youngest and largest labor forces in the world. Economic growth can be accelerated by demographic advantage, but doing so requires intentional investments in capacity building, education, training, skill development, and health. HRD seeks to increase organizational and individual capabilities through performance improvement, leadership development, and continuous learning. In a world that is rapidly changing due to technological innovation, digital transformation, and shifting labour markets, HRD becomes essential for preparing a workforce that is ready for the future.

Beyond only generating jobs, HRD supports social justice, entrepreneurship, innovation, and productivity across a range of industries, including government, business, education, and public services. Government initiatives including Make in India, Digital India, Skill India, and the National Education Policy (NEP) 2020 emphasize the value of HRD in national development plans. In order to achieve the Viksit Bharat goal, this study intends to explore the ways in which human resource development supports nation-building, social development, and economic progress.

Objective Of Study

1. To examine human resource development (HRD) as a concept and its implementation in the context of India's Viksit Bharat @2047 goal.
2. To investigate how HRD increases productivity and economic growth through education, skill development, and capacity building.
3. To look into how HRD activities, like digital skilling, education reforms, and skill development programs, contribute to the goals of Viksit Bharat.

4. To assess the importance of HRD in harnessing India's demographic dividend and developing a workforce ready for the future.
5. To evaluate the role that HRD plays in inclusive development, with a focus on women, youth, and marginalised communities.

Research Methodology

The Data required for this paper is mainly collected from secondary data sources collected from Annual Report, Books, Research papers and Internet.

Concept Of Human Resource Development

1. Education

Definition of Education: Education is the systematic process of acquiring the skills, values, attitudes, and information that enable individuals to develop intellectually and ethically and contribute significantly to society. Since education prepares people for both lifetime learning and constructive economic involvement, HRD claims that education is the cornerstone of human capital.

Key attributes:

Formal, Informal, and Non-Formal Learning: Learning can occur in a variety of settings, including classrooms, online courses, career training programs, and practical experiences.

Knowledge and Cognitive Development: Enhances the ability to think critically, solve problems, and make decisions.

Social and Cultural Values: Promotes civic responsibility, ethical consciousness, and collaboration.

Workforce Preparation: Provides the core skills needed for employability and professional progression.

2. Training

A purposeful effort to enhance an individual's technical, professional, or behavioural skills so they can perform specific tasks or responsibilities efficiently is known as training. Compared to general education, training is more skill-oriented, goal-specific, and useful.

Crucial characteristics:

The aim of skill development is to develop the specialist skills required for a particular job or industry.

Performance-oriented: Aim to boost productivity, efficacy, and workforce readiness.

Continuous or short-term: May be offered as workshops, online courses, on-the-job training, or off-the-job training.

Adaptability: Prepares employees for evolving organisational needs and technological breakthroughs.

3.Skill Development

Definition

Skill development is the process of enhancing people's aptitudes, proficiencies, and knowledge to enable them to perform tasks effectively and adapt to evolving work situations. It is a vital component of human resource development (HRD) since it links education and training to economic production and employability.

The key takeaway is that skill development includes soft skills, cognitive ability, digital literacy, and entrepreneurial qualities in addition to technical knowledge.

4.Capacity Building

The process of creating and enhancing the knowledge, skills, procedures, tools, and frameworks that people, groups, and communities require in order to endure, adjust, and prosper in a changing environment is known as capacity development.

Capacity Building Levels

Personal Level\

improving competences, attitudes, abilities, and knowledge.

Examples include workshops on technical skills, leadership development, and teacher training.

Level of Organization

Strengthening policies, procedures, structures, and systems.

Enhancing governance frameworks, financial accountability, and management processes are a few examples.

System/Institutional Level

Enhancing the external environment, frameworks, regulations, and policies.

Examples include regulatory frameworks, public policy enhancements, and educational reforms.

Importance Of Hrd In Viksit Bharat**1 Education as the HRD Foundation**

The main instrument for building human resources is education. Critical thinking, creativity, and problem-solving skills are all improved by high-quality education. Building a skilled workforce requires educational innovations including digital learning, vocational education, and curriculum modernisation. The objectives of Viksit Bharat are directly supported by the National Education Policy (NEP) 2020, which places a strong emphasis on skill-based learning, flexibility, and holistic development.

2. Employability and Skill Development

The disparity between education and work is one of India's biggest problems. This gap is filled in part by HRD programs that emphasise skill development.

Programs focused on skills enhance:

Youth employability

Employee productivity

Competitiveness in industry

Future economic growth depends on training in cutting-edge fields including digital technology, artificial intelligence, data analytics, and green skills.

3. Economic Growth and HRD

A knowledgeable and effective workforce boosts innovation potential, lowers operating expenses, and boosts productivity. Increased national income is a result of HRD.

Growth of industry

Attracting foreign investment

Strong HRD systems enable nations to thrive economically more quickly and sustainably.

4 Research, Development, and Innovation

Human resources with education and expertise are the engine of innovation. HRD promotes creativity, scientific thinking, and a research mindset. Collaboration between academic institutions, research centers, and business is crucial to fostering innovation.

India may transition from being a knowledge consumer to a knowledge generator with the help of a robust HRD framework.

5. Efficiency of Human Resources and Health

Both emotional and physical well-being are essential elements of HRD. People in good health are more flexible and productive. Investing in mental health, nutrition, cleanliness, and healthcare improves worker productivity and lowers absenteeism.

Long-term development objectives are supported and human capital is strengthened by public health efforts.

Challenges In Hrd Implementation

Despite advancements, India still confronts a number of HRD obstacles:

1. Unequal access to high-quality education
2. A skill gap between industry demands and training
3. Disparities at the regional and rural-urban levels
4. A low percentage of women in the workforce

5. The effects of technological advancement and automation

To completely achieve Viksit Bharat's goal, certain obstacles must be overcome.

Strategies For Strengthening HRD

The following actions are advised in order to improve HRD effectiveness:

- Infrastructure and quality improvements in schooling
 - Programs for skill development geared toward the industry encouragement of reskilling and lifelong learning
 - Increased spending on nutrition and healthcare
 - Policies that are inclusive of women and underrepresented groups
- HRD results can be further expedited through digital platforms and public-private partnerships.

Conclusion

The foundation of Viksit Bharat is human resource development. The ability, inventiveness, and dedication of a country's citizens are just as important to its development as its economic policies. India can turn its population potential into a tremendous engine for growth by enhancing innovation, health, education, and skills. A truly developed India would be made possible by effective HRD initiatives that guarantee social inclusion, sustainable growth, and global competitiveness.

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Problems of Agro-Processing Units on Farmers with reference to Wai Taluka**Mr. Ravindra Suresh Jamdade**

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Abstract

This paper explores the key problems and opportunities associated with agro-processing units and their impact on farmers' livelihoods, rural development, and agricultural value chains. Using existing literature and secondary data from studies in India and other agrarian economies, this research identifies structural constraints such as inadequate infrastructure, limited access to finance, technology gaps, market inefficiencies, and supply chain fragmentation that hinder smallholder participation. At the same time, agro-processing presents significant opportunities including value addition, income stability, employment generation, reduced post-harvest losses, and enhanced market access. Findings suggest that targeted policies, improved rural infrastructure, technological adoption, and strengthened market linkages are critical to enable farmers to benefit more fully from agro-processing systems.

Key words Agro-Processing Units, Problems and Opportunities.

1. Introduction

Agro-processing refers to the transformation of raw agricultural produce into value-added products (e.g., milling grains, fruit processing, dairy products) that are more durable and marketable (Agriculture. Institute, n.d.; Agric4Profits, n.d.). As a crucial link between agriculture and industry, agro-processing has the potential to generate rural employment, strengthen farmers' incomes, and reduce seasonal volatility in agricultural markets. In India, although agriculture employs a significant share of the workforce, the agro-processing sector remains underdeveloped relative to its potential due to persistent challenges in infrastructure, finance, technology, and market access (Gowtham & Manivel, 2025; Verma & Shrivastava, 2023). This paper synthesizes literature on these problems and opportunities and analyzes their implications for farmers.

2. Literature Review & Data Sources

This paper is based on secondary data from peer-reviewed journals, government-level analyses, and sector reports:

Jamdade & Khedkar's (2025) study on the impact of agro-processing units on farmers in Maharashtra shows income benefits and persistent operational challenges.

mswmanagementj.com

Research on constraints in unorganized agro-processing units highlights financing, infrastructure, and information deficits that limit performance.

Indian Agricultural Research Journals

A comprehensive review of agro-processing challenges in India outlines structural impediments and growth prospects.

IJFMR

Sectoral analyses describe general benefits and challenges of value addition and rural industrialization.

3) Object

- 1) To find the problem arise the Famers to reduce earning capacity
- 2) To increase various opportunities the profit earning capacity Famars to reduce the

Research Methodology

The study was conducted in Satara district, Maharashtra, focusing on two talukas Wai Karad and Phaltan where agro-processing units are highly concentrated. A descriptive and analytical research design was adopted. Primary data were collected through a field survey, while secondary data were obtained from the District Agriculture Office, NABARD, and published journals. A multi-stage random sampling technique was employed, with a pilot survey conducted on a sample of 40 farmers to refine the questionnaire and methodology. For the main study, 40 farmers having supply agreements with agro-processing units were randomly selected, along with a control group of 40 farmers from the same region who sold primarily in APMCs or to local traders. Data were collected using a pre-tested, structured questionnaire covering demographics, landholding, crops grown, annual income, marketing patterns, and farmers' perceptions regarding agro-processing units. Data was analyzed using SPSS software. Descriptive statistics (mean, standard deviation) were used for profiling. Inferential statistics, including an independent samples t-test, were used to compare the two groups of farmers and test the hypotheses.

Data Analysis, Results, and Discussion

The table presents the **descriptive statistics** showing the effect of natural calamities on farming profitability in Satara district. Statistical measures such as **mean and standard deviation** are used to summarize farmers' perceptions regarding crop loss, increased cultivation costs, reduced income, and financial stress. These statistics provide an overview of the extent and variability of the impact of natural calamities on farming profitability.

Table: 1.**Descriptive Statistics of Effect of Natural Calamities on Farming profitability**

Variables	N	Sum	Mean
Natural calamities (floods, droughts, storms) frequently occur in my area.	100	16.80	0.168
Natural calamities have directly affected the functioning of my unit.	100	17.02	0.172
Natural calamities often disrupt supply of raw materials.	100	17.62	0.176
The frequency of natural disasters has increased over the past five years.	100	15.40	0.154
Our agro-processing unit is vulnerable to natural calamity damage.	100	17.31	0.173
Valid N (listwise)	100		

Source: Primary data

1. Natural calamities (floods, droughts, storms) frequently occur in my area: The mean value of 4.20 indicates that most respondents agreed that natural calamities such as floods, droughts, and storms frequently occur in their region. This shows that climatic disturbances are a common phenomenon affecting agricultural activities. The mean deviation of 0.168 suggests a moderate variation in responses, meaning experiences differ slightly based on geographic location and preparedness.

2. Natural calamities have directly affected the functioning of my unit: The calculated mean score of 4.16 reveals that respondents largely agree that natural calamities directly affect the functioning of their agro-processing units. Such effects may include production delays, infrastructure damage, and financial losses. The mean deviation of 0.172 indicates moderate variability in the responses, implying that the extent of the impact differs among farmers.

3. Natural calamities often disrupt supply of raw materials: This disruption can result in irregular production cycles, delayed deliveries, and increased costs.. The variance of 0.176 confirms the consistency of opinions among most respondents. Therefore, it is evident that the supply chain is one of the most vulnerable aspects of agro-processing during natural calamities.

4. The frequency of natural disasters has increased over the past five years:. This finding suggests a growing awareness among farmers regarding changing climate patterns and their effects. The standard deviation of 0.88498 and variance of 0.783 show relatively low dispersion, indicating that most respondents share similar views. This consistent agreement points toward a clear perception of environmental degradation. Hence, the data implies a notable rise in natural disasters, affecting both farming stability and long-term profitability.

5. Our agro-processing unit is vulnerable to natural calamity damage: The mean score of 4.33 is the highest among all variables, indicating that respondents strongly agree their agro-processing units are vulnerable to natural calamity damage. This reflects a serious concern about the safety and sustainability of agricultural infrastructure. The standard deviation of 1.23935 and variance of 1.536 show greater variability, suggesting that some units may have adopted protective measures while others remain highly exposed. The data highlights the urgent need for better disaster management practices. Overall, it shows that vulnerability to natural calamities is a major issue affecting profitability and continuity of operations.

Across studies, inadequate infrastructure is a persistent constraint. Poor rural connectivity, limited cold chain and storage facilities, unstable power supply, and outdated processing equipment increase operational costs and reduce efficiency.

Agriculture Institute

Financial Constraints

Small-scale agro-processing units often lack access to credit and face high interest costs, hindering investment in modernization and scale expansion (Sekyi et al., in Verma & Shrivastava, 2023).

IJFMR

Technological and Knowledge Gaps

Insufficient technology adoption, lack of training, and outdated machinery limit product quality and competitiveness. Many potential processors also lack information about market trends and modern post-harvest technologies.

Indian Agricultural Research Journals

Marketing and Supply Chain Issues

Fragmented supply chains, inadequate marketing channels, lack of branding, and weak backward and forward linkages prevent farmers and small processors from accessing lucrative markets and achieving fair prices.

Agriculture Institute

Value Addition and Income Enhancement

Agro-processing increases the value of raw produce, allowing farmers to earn higher returns than selling raw commodities alone. This can stabilize income and reduce production risk.

Agriculture Institute

Employment and Rural Development

Processing units generate employment in rural areas across various functions—production, packaging, logistics—reducing migration to urban centers.

Agriculture Institute

Rural Industrialization and Entrepreneurship

Agro-processing fosters rural industrialization by encouraging small and medium enterprises and cooperative models, enabling farmers to engage in value-added activities beyond primary agriculture.

Agriculture Institute

Post-Harvest Loss Reduction

By transforming perishable produce into processed goods, agro-processing significantly reduces post-harvest losses, improving resource efficiency and food security.

Agric4Profits

Findings

Linkages with agro-processing units can improve farmers' incomes, access to input markets, and financial risk mitigation. However, challenges like delayed payments, quality standards, and operational constraints remain prevalent.

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Structural constraints (infrastructure, finance, technology) disproportionately affect smallholders and unorganized units, limiting their integration into formal processing chains.

Indian Agricultural Research Journals

Policy interventions such as targeted finance schemes, infrastructure development programs, and skill enhancement initiatives are essential to unlock the full potential of agro-processing as a driver of inclusive rural growth.

Conclusion

Agro-processing units present both problems and opportunities for farmers. While significant constraints impede optimal performance—especially for small and cooperatively organized enterprises—there is clear evidence that value addition through processing can enhance farmer incomes, reduce risk, generate employment, and boost rural economies. Strategic interventions in infrastructure, financing, technology access, and market linkage development are critical to ensuring that farmers can participate equitably in agro-processing value chains.

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**Social Media, Digital Platforms and Financial Sustainability of Photography Businesses:
Emerging Commerce Trends toward Viksit Bharat-2047****Adv. Vivek Vishwanath Bongale,**

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Abstract

Social media, digital platforms, and artificial intelligence (AI) are growing very quickly. This has changed photography businesses from traditional studio-based models to flexible digital businesses. Based on secondary data, this paper looks at how AI-enabled tools, social media marketing, and platform-based commerce affect the ability of photography businesses to stay in business. The study talks about new trends like backgrounds made by AI, editing that is done automatically, digital branding, and getting clients online. These trends lower the amount of money needed to start a business and make it run more smoothly. Researchers have found that going digital helps businesses make more money and grow, but it also makes competition tougher and requires more skills. The paper makes the case that creative entrepreneurship that is driven by technology leads to innovation-led business, which is in line with the vision of Viksit Bharat-2047. Policy and management suggestions are made to help creative service businesses improve their digital skills and long-term business plans.

Keywords: Artificial Intelligence, Digital Platforms, Photography Business, Financial Sustainability, Viksit Bharat-2047

1. Introduction

Innovation, entrepreneurship, digitalization, and economic resilience are seen as important building blocks for India's long-term growth in the Viksit Bharat-2047 vision. One big part of the new digital economy is the creative service sector, especially photography businesses. This is because they combine artistic skills with business practises. In the past, photography businesses were based around studios, which meant they had to spend a lot of money on things like studio space, lighting, backdrops, and equipment. But fast changes in social media sites, online markets, and artificial intelligence (AI) technologies have completely changed this structure.

In recent years, photographers have been more reliant on internet platforms for marketing, portfolio presentation, client communication, and payment methods. AI capabilities now allow for automated editing, virtual backdrop creation, and process automation, decreasing dependency on physical facilities and cutting entry hurdles for new entrepreneurs. This change from asset-heavy operations to technology-driven ones has created significant challenges about financial sustainability and long-term competitiveness.

Understanding these transitions is critical in the context of Viksit Bharat-2047, in which digital entrepreneurship and technology innovation are anticipated to generate inclusive economic growth. This article uses secondary data analysis to investigate how social media, digital platforms, and AI are reshaping photographic business models and contributing to long-term economic growth.

2. Research Gap

While previous study concentrated on digital marketing and social media use in small companies, little has been done to investigate how AI-enabled solutions minimize infrastructure reliance and influence financial sustainability in photographic business operations. The majority of current material focuses on digital adoption rather than tying creative service revolutions to wider economic ideas like Viksit Bharat-2047. Furthermore, talks about photography firms often emphasis artistic characteristics above commerce, administration, and financial results. This study addresses this gap by incorporating digital commerce theories, AI innovation, and financial sustainability into the structure of creative business.

3. Objectives of the Study

1. To examine the role of social media and digital platforms in transforming photography business models.
2. To analyse the impact of AI-driven technologies on cost structure and financial sustainability.
3. To identify emerging commerce trends in photography businesses relevant to Viksit Bharat-2047.

4. Methodology

This study is conceptual and analytical in nature and is based entirely on secondary data obtained from:

- Government publications on Digital India and MSME development
- Research articles on digital entrepreneurship and creative industries
- Industry reports on AI applications and social media marketing
- Digital economy reports by international organizations
- Market surveys related to online commerce and platform economies

Analytical Approach

- Thematic analysis to identify recurring patterns in literature
- Comparative evaluation of traditional and digital business models
- Conceptual synthesis linking technology adoption to financial sustainability

5. Conceptual Framework

AI and Digital Transformation Framework

Social Media + Digital Platforms + AI Tools → Business Model Innovation → Cost Reduction + Revenue Diversification → Financial Sustainability → Contribution to Viksit Bharat-2047

This framework illustrates that technology adoption acts as a catalyst for business model innovation, which subsequently strengthens financial outcomes and supports national development objectives.

6. AI Impact on Photography Business Models

Artificial intelligence has become a major transformative force in the photography industry. Traditionally, photographers required expensive physical setups for backgrounds, lighting, and post-production. AI now enables virtual alternatives that significantly reduce investment requirements.

Major AI-driven changes include:

- AI-generated backgrounds replacing physical studio setups
- Automatic colour correction and image enhancement
- Smart object removal and scene generation
- AI-assisted album design and workflow automation
- Virtual shooting environments and digital compositing

These technologies reduce production time, improve efficiency, and make high-quality outcomes accessible even to small-scale entrepreneurs.

Table 1: Traditional vs AI-Enabled Photography Business Model

Business Aspect	Traditional Model	AI-Enabled Digital Model
Studio requirement	Essential	Optional
Background investment	High physical cost	AI-generated backgrounds
Editing process	Manual and time-consuming	Automated AI editing
Marketing channels	Local referrals	Digital platforms
Initial investment	High	Moderate / low
Scalability	Limited	High

Interpretation:

AI-driven tools significantly reduce operational barriers, making entrepreneurship more accessible and financially viable.

7. Role of Social Media and Digital Platforms

Social media platforms function as digital marketplaces where photographers build brand presence, engage clients, and secure bookings. Platforms allow direct communication and eliminate many traditional intermediaries.

Key contributions to business sustainability:

- Portfolio visibility to wider audiences
- Low-cost targeted advertising
- Real-time customer interaction
- Online reviews enhancing credibility
- Seamless digital payment systems

Table 2: Digital Platform Practices and Financial Outcomes

Digital Practice	Financial Impact
Social media branding	Increased visibility and revenue
Online advertising	Reduced marketing cost
Digital engagement	Repeat clientele
Platform-based promotions	Faster customer acquisition
Online payments	Improved cash flow

Interpretation: Digital platforms improve revenue stability by enabling consistent customer engagement and lower promotional expenses.

8. Emerging Commerce Trends toward Viksit Bharat-2047

Secondary data analysis highlights several emerging commerce trends that are reshaping photography businesses and contributing to broader national development priorities under the vision of **Viksit Bharat-2047**. These trends demonstrate how digitalisation, artificial intelligence, and entrepreneurial innovation are transforming creative service sectors into dynamic contributors to the digital economy.

8.1 Asset-Light Entrepreneurship : One of the most significantly observed is the rise of asset-light entrepreneurship. Historically, photographic enterprises required significant financial investment in studio infrastructure, lighting systems, physical backgrounds, and specialized equipment. With the use of AI-based editing software, virtual backgrounds, and cloud-based digital tools, entrepreneurs can now start and run photography enterprises with minimum infrastructure. This move lowers the financial risk for new entrants and encourages young professionals to pursue self-employment alternatives. Asset-light approaches also enhance flexibility, enabling organizations to grow operations without incurring corresponding increases in fixed expenditures. Such entrepreneurship is consistent with the national goal of supporting startups and innovation-driven economic development under Viksit Bharat-2047. By eliminating entry barriers, AI-enabled solutions facilitate equitable participation in commerce and improve the viability of small businesses.

8.2 Platform-Based Service Economy : Another significant development is an increased reliance on digital channels for corporate operations. Social media networks and internet markets increasingly serve as virtual shops for photographers to display portfolios, communicate with clients, and obtain appointments. Digital platforms enable direct connection between service suppliers and clients, decreasing reliance on traditional intermediaries and broadening market reach beyond local limits. Photographers may create strong digital identities and attract a wide audience by using targeted advertising, content marketing, and online reviews. The platform-based service economy helps to improve transparency, efficiency, and client convenience, all of which are important aspects of contemporary commerce. This tendency promotes the growth of a digitally linked economy and increases the position of micro and small businesses in India's larger digital commerce ecosystem.

8.3 Revenue Diversification : Additional information show that photography enterprises are shifting to more diverse income strategies. Previously, revenue generating was mostly dependent on event-based engagements like as weddings and studio portraits. Online picture editing services, digital product sales, virtual photographic consultations, instructional content development, and online training programs are all examples of new income streams brought forth by digital transformation. Revenue diversification decreases reliance on seasonal demand while increasing financial stability by providing consistent revenue sources. This paradigm boosts corporate resilience, especially amid economic upheavals or market changes. Diversified income methods represent current business trends in which service businesses use technology to broaden their offers and increase profitability. Such innovation-driven diversification leads to sustainable entrepreneurship, promoting financial stability as envisioned in Viksit Bharat-2047.

8.4 Digital Skill Integration : As technology becomes more important to business achievement, digital skill integration has become a must-have for photographic professionals. Modern photographers must combine artistic skills with knowledge of digital marketing, social media analytics, AI tool utilization, consumer interaction techniques, and online branding. Skills such as content production, algorithm knowledge, and data-driven decision-making are becoming more important for maintaining competitiveness. This tendency represents a larger movement toward transdisciplinary human resource development, in which creativity and technology literacy coexist. Continuous upskilling allows workers to adapt to quickly changing digital environments, which adds to increased productivity. From a national development standpoint, digital skill integration increases human capital and promotes the growth of a digitally empowered workforce, which is critical for fulfilling Viksit Bharat-2047's innovation-focused objectives.

Overall, these emerging commerce trends illustrate how technology-driven transformation in creative industries can promote entrepreneurship, enhance financial sustainability, and contribute to inclusive economic development.

Table 3: Emerging Trends and Development Contribution

Emerging Trend	Business Outcome	Link to Viksit Bharat
AI automation	Cost efficiency	Technological innovation
Social media marketing	Market expansion	Digital commerce growth
Online entrepreneurship	Employment generation	Startup ecosystem
Skill enhancement	Productivity gains	Human resource development

9. Discussion

The growth of photography enterprises fits into a larger trend toward digital commerce models. AI-generated surroundings and automated editing decrease the need for expensive physical infrastructure, allowing small businesses to join the market with little resources. Social media platforms improve company sustainability by providing direct consumer contact and cost-effective marketing methods.

However, rising competition and algorithm dependency need ongoing innovation and brand uniqueness. Financial viability is increasingly dependent not just on technical photographic abilities, but also on digital literacy, marketing strategy, and flexibility to changing technology. These results show that creative sectors may make a major contribution to economic growth when supported by digital ecosystems and skill development programs.

10. Suggestions and Policy Implications

1. Develop AI-focused digital training programs for creative entrepreneurs.
2. Include photography and creative digital services within MSME support frameworks.
3. Promote affordable access to digital tools and software through subsidies or training partnerships.
4. Establish regional digital marketplaces for creative professionals.
5. Encourage entrepreneurship incubation programs focused on creative industries.

11. Conclusion

Social media, digital platforms, and AI technologies are changing photography businesses, transforming them from infrastructure-intensive to flexible digital firms. AI-generated backdrops and automated processes lower costs while enabling new types of entrepreneurship, hence improving financial sustainability. These developing commerce trends are highly aligned with the goal of Viksit Bharat-2047, which promotes innovation, digitalisation, and inclusive economic development. Strengthening digital skills and policy support will guarantee that the creative service sectors make an important contribution to India's future growth.

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A Study on Quality of Work- Life and Economic Empowerment among Domestic Women Workers in Satara District

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Abstract:

Domestic women workers play an important role in maintaining households, yet their work remains largely informal, unregulated, and undervalued. In Satara District, many women engage in domestic work to support their families financially. However, balancing work responsibilities with personal and family life becomes challenging due to long working hours, low wages, job insecurity, and lack of social protection.

This study aims to analyze the work-life balance conditions of domestic women workers and examine how their employment contributes to their economic empowerment. The study highlights the need for better working conditions, fair wages, and supportive policies to improve their quality of life.

Keywords: *Quality of Work Life. Economic Empowerment, Domestic Women Workers, Satara District, Informal Sector.*

1.1 Introduction

Domestic women workers play a significant role in sustaining urban households and supporting the informal economy. These workers contribute through essential services such as cleaning, cooking, childcare, and elderly care. Despite their valuable contribution, domestic women workers often remain socially and economically marginalized. Quality of Work Life (QWL) refers to the overall well-being of workers in relation to their working conditions, job security, wages, work environment, and work-life balance.

Economic empowerment is another crucial dimension for domestic women workers, as it determines their ability to earn independently, manage finances, improve living standards, and gain decision-making power within the household and society. Empowering domestic women workers economically can enhance their self-confidence and social status. Satara District has witnessed an increasing demand for domestic work due to urbanization and changing family structures.

1.2 Review of Literature : Review of literature is an essential part of any research study, as it provides a theoretical background and highlights previous studies related to the research topic. The present study focuses on the work-life balance and economic empowerment of domestic women workers in Satara District.

- **Bridget Anderson (2010)** examined the socio-economic conditions of domestic workers and highlighted that domestic labor is often invisible and unregulated. The study emphasized that domestic workers face exploitation due to lack of formal contracts and social security benefits.
- **Shinde (2017)**, in her thesis, explored challenges faced by domestic workers engaged in informal household employment. The study reported that women domestic workers experience low wages, long working hours, job insecurity, and limited access to legal protection. **Pandey (2017)** highlighted the issue of violence and harassment faced by women workers in the unorganized sector, affecting their psychological well-being and empowerment.
- **Kamble and D. (2014)** explained that work-life balance refers to the ability of individuals to manage work responsibilities along with family and personal life. The study highlighted that imbalance leads to stress, dissatisfaction, and reduced productivity.
- **Mankar (2018)** studied the impact of work-life balance on job satisfaction in the manufacturing sector. Although the study focused on formal employees, it concluded that long working hours and work pressure negatively influence personal well-being.
- **Nigade and Bhola (2016)** examined the relationship between work-life balance and quality of work life among women in the service sector. The study emphasized that women face greater difficulties in balancing work and family due to societal expectations and multiple responsibilities.

Research Gap

The review of existing literature indicates that several researchers have studied domestic women workers in relation to informal employment, poor working conditions, exploitation, and lack of legal protection. Many studies have also focused on work-life balance among women employees in organized sectors such as manufacturing, service industries, and corporate workplaces. While very few studies provide a detailed understanding of domestic women workers in Satara District. The Lack of combined analysis of quality of work-life and economic empowerment study. Therefore, the present study attempts to fill gaps by examining the quality of work-life conditions & economic empowerment of domestic women workers in Satara District .

1.3 Objectives of the Study

1. To analyze the domestic women workers in study area.
2. To examine the economic empowerment among domestic women workers.
3. To suggest measures for improving the quality of work life and economic empowerment.

1.4 Hypotheses of the Study**Null Hypotheses (H₀)**

H₀ 1: There is no significant relationship between quality of work life and economic empowerment.

H₀ 2: quality of work life does not significantly affect the economic empowerment.

H₀ 3: Working hours does not significantly influence the quality of work life of domestic women workers.

Alternative Hypotheses (H₁)

H₁ 1: There is a significant relationship between quality of work life and economic empowerment

H₁ 2: quality of work significantly affects the economic empowerment.

H₁ 3: Working hours significantly influence the quality of work life of domestic women workers

1.5. Research Methodology:

This study explores the quality of work life and economic empowerment of 100 Domestic women workers/Employees who engaged in different type of domestic work in Satara district. The research design: descriptive, analytical and The Convenience sampling Method is used. Approach, examining economic empowerment, quality of work life job satisfaction. The data for the study was collected using a structured questionnaire and face to face interviews. The collected information was explained with help of descriptive statistics, correlation and regression analysis.

1.5 Sampling of the study: Sampling in a study is the crucial process and it is representative larger group to collect data and make inferences. It ensuring the study is practical, cost-effective, and accurate by avoiding the infeasibility of studying everyone. In this study we have adopted random sampling method for determining sample size to ensure findings accurately reflect the whole group.

1.6 Data analysis and interpretation:

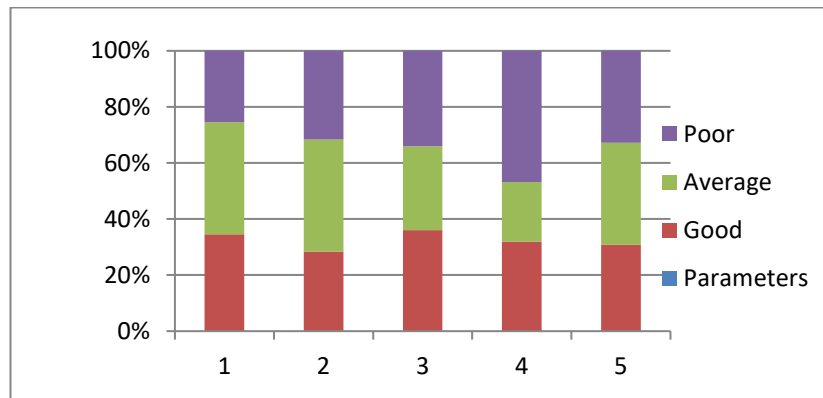
1.6.1 Level of Economic Empowerment among Domestic Women Workers : The Level of Economic Empowerment among Domestic Women Workers is generally challenging, characterized by significant role conflict and overload as they juggle demanding work with primary domestic and family responsibilities, leading to stress, burnout, lack of financial awareness, banking services, internet banking, mobile banking, investment and saving habit and potential negative impacts often requiring strong organizational support, financial awareness internet banking knowledge etc.

Table 1. 1 Level of Economic Empowerment among Domestic Women Workers

Sr. No	Parameters	Good	Average	Poor	Total
1	Income Sufficiency	30(30%)	45(45%)	25 (25. %)	100 (100%)
2	Saving Habit	28 (28. %)	42 (42%)	30(30 %.)	100 (100%)

3	Financial Independence	32 (32%)	40(40%)	28 (28. %)	100 (100%)
4	Access to Banking Services	35(35%)	41(41%)	24 (24%)	100 (100%)
5	Decision making in household Services	29 (29. %)	44(44. %)	27 (27%)	100 (100%)

(Source: Primary data complied)

Graph.1 Work–Life Balance

- The table shows that 30% of domestic women workers reported a good level of income sufficiency, however, 45% of respondents fall under the average category, 25% of women reported a poor level.
 - With regard to savings, 28% of women workers demonstrated a good. The majority of women 42% belong to the average category, implying irregular or limited saving due to low income. Additionally, 30% reported poor saving habit.
- The findings reveal that 32% of respondents have a good level of financial independence, 40% reported an average level, Meanwhile, 28% fall under the poor category.
 - The table indicates that 35% of women workers have good access to banking. About 41% have an average level of access, Nearly 24% have poor access, reflecting limited awareness,
 - In terms of decision making power, 29% of women workers reported a good level, showing active involvement in household financial decisions. The majority 44% fall under the average category, around 27% reported a poor level,

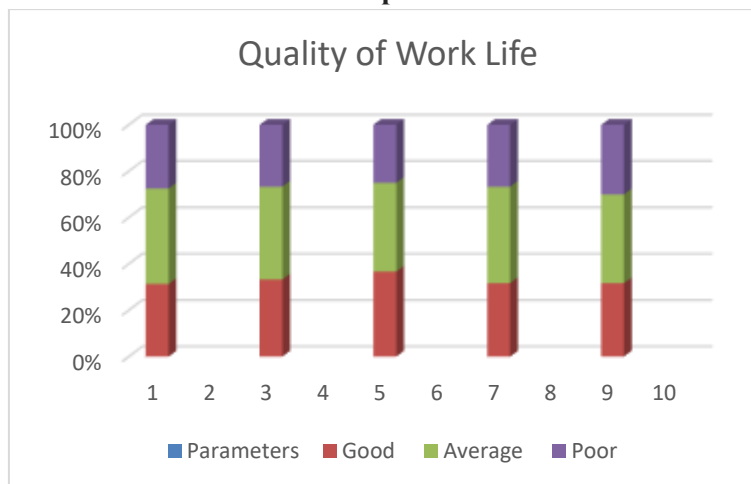
1.6.2 Level of Quality Work Life: The "Level of Quality Work Life" (QWL) reflects an employee's overall satisfaction and well-being at work, encompassing aspects like fair pay, safe conditions, work-life balance, growth opportunities, social integration, and the meaning derived from their job, with high levels leading to better motivation, productivity, and retention,

Table No-1.2
Level of Quality Work-Life of Domestic Women Workers

Sr. No	Parameters	Good	Average	Poor	Total
1	Salary	31(31%)	45(45%)	24 (24. %)	100 (100%)
2	Job Security	28 (28. %)	40 (40%)	32(32 %)	100 (100%)
3	Working Conditions	30 (30%)	42(42%)	28 (28%)	100 (100%)
4	Health & Safety	30(30%)	40(40%)	30 (30%)	100 (100%)
5	Overall QWL	28 (28%)	42(42%)	30 (30%)	100 (100%)

(Source: Primary data complied)

Graph 2.



1. The average level of satisfaction with salary 35 percent can be attributed to irregular income; but 23 percent women workers have limited salary. Although 25 percent of respondents reported good satisfaction, On the other hand poor satisfaction 23.33 percent reflects inadequate wages that are insufficient to meet rising living expenses.
2. In terms of job security, a significant proportion of respondents rated it as average 40 percent mainly due to informal employment arrangements and lack of written contracts. Good perception of job security 33.33 percent may be associated with long-term engagement in the same occupation or employer trust. The dominance of average responses 38.33 percent indicates moderately acceptable environments, though limited facilities and work pressure reduce overall satisfaction. The good rating 36.67 percent may be due to supportive workplace and manageable work demands.
3. Similarly health and safety condition being rated as average by 41.67 percent reflect partial availability of safety measure, while lack of awareness and poor implementation lead to dissatisfaction among others.
4. The quality of work life is perceived as average by the majority 38.33 percent suggesting that while women workers are coping with existing conditions, improvements in wages, job security and health and safety provisions are necessary to enhance their overall work life experience .

1.7 Findings of the Study

1. Due to limited time to family it creates problem of anxiety, diminished self-esteem, and strain on relationships.
2. The constant juggling act contributes to burnout, fatigue, and increased stress levels, affecting well-being.
3. Potential for unhealthy eating, weight gain, and cardiovascular issues due to chronic stress and lack of time for exercise
4. Poor quality of work-life can negatively affect job performance and overall satisfaction.
5. The study finds that domestic women workers in Satara district face difficulties in maintaining quality of work-life due to long working hours, workload, and family responsibilities.
6. Low income level, job security and workplace conditions significantly influence their quality of work life.

Suggestions:

- 1 To improve Quality of Work Life (QWL), focus on balancing work and personal time through time management, setting boundaries, and taking breaks, while organizations should foster supportive

environments, growth opportunities, recognition, fair treatment, and flexible schedules to boost employee well-being and engagement. Key areas include job design.

- 2 To enhance the economic empowerment of domestic women workers, it is suggested that government agencies NGOs, and self-help groups should provide skill development training and financial literacy programs. Such initiatives will help women improve their income opportunities, develop regular saving habits, gain better access to banking services, and increase their participation in household financial decision-making.

1.8 Conclusion

The study concludes that Quality of Work Life and Economic Empowerment among Domestic Women Workers in Satara District are affected by demanding work with primary domestic and family responsibilities, leading to stress, burnout, lack of financial awareness, banking services, internet banking, mobile banking, investment and saving habit and potential negative impacts working conditions, income and family responsibility.

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Impact of Digital Governance Initiatives on Citizen Satisfaction and Economic Participation: An Empirical Study in Kolhapur District in the Context of Viksit Bharat-2047

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Abstract

Digital governance has become a central pillar in India's development roadmap toward achieving the vision of Viksit Bharat-2047. Both the Central Government and the Government of Maharashtra have implemented various digital initiatives to improve transparency, service efficiency, and citizen engagement. Programs such as Direct Benefit Transfer (DBT), online income tax portals, digital land records, e-district services, MahaDBT, and other e-governance platforms aim to simplify administrative processes and encourage broader economic participation. This study examines the impact of digital governance initiatives of the Central and Maharashtra State Governments on citizen satisfaction and economic participation in Kolhapur district. Primary data were collected from 400 respondents using a structured questionnaire targeting active users of digital public services. The study evaluates factors such as accessibility, transparency, reliability, and trust in digital systems, and analyzes their influence on citizen satisfaction and participation in economic activities including digital payments, online registrations, and government scheme utilization. Statistical tools such as percentage analysis, correlation, and regression were applied. The findings provide policy insights for strengthening digital governance frameworks to support inclusive growth and sustainable development under Viksit Bharat-2047.

Key Words: Digital Governance, Citizen Satisfaction, Economic Participation, E-Governance Initiatives, Viksit Bharat-2047.

Introduction

India's vision of becoming a developed nation by 2047, known as *Viksit Bharat-2047*, highlights the importance of transparent governance, technological advancement, and inclusive economic growth. Digital governance has become a critical tool in achieving these objectives by improving efficiency, reducing administrative delays, and enhancing citizen access to public services. The integration of information and communication technology (ICT) into government functioning has significantly transformed service delivery systems (Heeks, 2006).

The Government of India, through initiatives such as Digital India, Direct Benefit Transfer (DBT), and online tax and service portals, has aimed to create a transparent and citizen-centric governance structure (MeitY, 2022). Similarly, the Government of Maharashtra has implemented digital platforms such as Maha DBT and e-District services to streamline welfare distribution and administrative processes. These initiatives are designed not only to improve service accessibility but also to encourage greater participation in formal economic activities.

Digital governance can enhance citizen satisfaction by ensuring faster service delivery, greater transparency, and reduced procedural complexity (Bhatnagar, 2014). At the same time, effective digital systems may promote economic participation through online registrations, digital payments, and utilization of government schemes. In this context, the present study examines the impact of digital governance initiatives on citizen satisfaction and economic participation in Kolhapur district, contributing to the broader goals of Viksit Bharat-2047.

Review of Literature

Digital governance has been widely recognized as a transformative approach to improving public administration and service delivery. Heeks (2006) emphasized that e-governance enhances transparency,

reduces corruption, and improves efficiency by minimizing human intervention in administrative processes. His work highlights the role of information and communication technology (ICT) in strengthening governance systems, particularly in developing countries.

Bhatnagar (2014) argued that successful e-governance initiatives contribute significantly to citizen satisfaction when services are accessible, reliable, and user-friendly. According to his findings, digital platforms reduce transaction costs and procedural delays, thereby increasing public trust in government institutions. However, the effectiveness of such systems depends on digital literacy and infrastructure availability.

United Nations (2022), in its E-Government Development Report, noted that digital public services play a crucial role in promoting inclusive growth and citizen participation. The report emphasized that digital governance not only enhances administrative efficiency but also supports economic participation by facilitating access to welfare schemes, business registrations, and tax compliance mechanisms.

Similarly, Dwivedi et al. (2017) observed that citizen satisfaction in e-governance depends on perceived usefulness, ease of use, and trust in digital systems. Their study suggests that technological acceptance and system transparency are key determinants of successful digital governance adoption.

In the Indian context, initiatives under the Digital India programme have significantly expanded access to online services and financial inclusion platforms. However, regional-level empirical studies examining the combined effect of digital governance on citizen satisfaction and economic participation remain limited. Therefore, this study aims to fill this gap by examining the impact of central and state digital governance initiatives in Maharashtra on citizens in Kolhapur district, within the broader framework of Viksit Bharat-2047.

Research Gap

Previous studies have mainly focused on the technological aspects of e-governance, service quality, and digital adoption at national or international levels. While research highlights the importance of digital governance in improving transparency and administrative efficiency, limited attention has been given to examining its combined impact on citizen satisfaction and economic participation at the district level. Moreover, empirical studies that simultaneously evaluate initiatives of both the Central Government and the Government of Maharashtra in a specific regional context remain scarce. There is a need for localized, primary data-based analysis to understand how digital governance initiatives influence citizens' engagement in economic activities. This study addresses this gap by investigating the relationship between digital governance, citizen satisfaction, and economic participation in Kolhapur district within the framework of Viksit Bharat-2047.

Objectives of the Study

1. To examine the impact of digital governance initiatives of the Central Government and the Government of Maharashtra on citizen satisfaction in Kolhapur district.
2. To analyse the influence of digital governance initiatives on the economic participation of citizens in the Kolhapur district

Hypothesis

1. There is no significant relationship between digital governance initiatives and citizen satisfaction in Kolhapur district.

Research Methodology

The present study is empirical and quantitative in nature and adopts a descriptive and analytical research design. It examines the impact of digital governance initiatives of the Central Government and the Government of Maharashtra on citizen satisfaction and economic participation in Kolhapur district, Kolhapur. Primary data were collected through a structured questionnaire administered to citizens who actively use digital government services such as online tax portals, Direct Benefit Transfer (DBT) systems, and other e-governance platforms. Secondary data were obtained from government reports and relevant academic literature.

A total of 400 respondents were selected using proportionate sampling based on Census population data to ensure representation from all twelve talukas of the district. The variables were measured using five-point Likert scale statements. Statistical tools such as percentage analysis, mean, standard deviation, correlation, and regression were applied to analyse the data and test the formulated hypotheses.

Result and Discussion

Table 1: Descriptive Statistics (N = 400)

Variable	Mean	Std. Deviation
Digital Governance Initiatives	3.84	0.62
Citizen Satisfaction	3.76	0.68
Economic Participation	3.69	0.71

The mean scores of all variables are above 3.50, indicating a generally positive perception of digital governance services among respondents. Citizens perceive digital platforms as accessible and efficient, leading to higher satisfaction levels. Economic participation through digital services such as online tax filing, digital payments, and scheme utilization is also moderately strong in Kolhapur district.

Table 2: Correlation Analysis

Variables	Digital Governance Initiatives
Citizen Satisfaction	0.64
Economic Participation	0.58

Note: $p < 0.01$

The correlation results show a strong positive relationship between digital governance initiatives and citizen satisfaction ($r = 0.64$, $p < 0.01$). Similarly, a significant positive relationship exists between digital governance initiatives and economic participation ($r = 0.58$, $p < 0.01$). This indicates that improved digital governance services are associated with higher satisfaction levels and increased economic engagement.

Table 3: Regression Analysis

Dependent Variable	Beta (β)	R ²	F-value	p-value
Citizen Satisfaction	0.64	0.41	231.34	0.000
Economic Participation	0.58	0.34	205.18	0.000

Regression analysis confirms that digital governance initiatives significantly influence both citizen satisfaction and economic participation. The R² value of 0.41 indicates that 41% of the variation in citizen satisfaction is explained by digital governance initiatives. Similarly, 34% of the variation in economic participation is explained by digital governance initiatives.

The F-values are statistically significant ($p < 0.001$), indicating a good model fit. Since the p-values are less than 0.05, the null hypotheses are rejected. These findings demonstrate that effective digital governance initiatives of the Central Government and the Government of Maharashtra play a significant role in enhancing public satisfaction and promoting economic participation in Kolhapur district, contributing toward the goals of Viksit Bharat-2047.

Conclusion

The present study examined the impact of digital governance initiatives of the Central Government and the Government of Maharashtra on citizen satisfaction and economic participation in Kolhapur district. The findings reveal that digital governance initiatives significantly influence both citizen satisfaction and economic engagement. Improved accessibility, transparency, and efficiency of digital platforms have positively contributed to higher satisfaction levels among citizens. Moreover, digital governance has encouraged greater participation in economic activities such as online registrations, digital transactions, and utilisation of government schemes.

The study confirms that effective digital governance acts as a catalyst for inclusive growth at the district level. Strengthening digital infrastructure and enhancing citizen trust in digital systems can further accelerate progress toward the objectives of Viksit Bharat-2047.

Suggestions

1. Improve the user-friendly interface of government portals.
2. Provide multilingual digital service options.
3. Conduct awareness campaigns regarding digital schemes and services.
4. Establish stronger grievance redressal mechanisms.

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A Strategic Analysis of the Brand War Between Parachute (Marico) and Nihar Coconut Oil (HUL) in the Indian Coconut Oil Market

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Abstract

The Indian coconut oil market represents one of the most interesting competitive environments within the fast-moving consumer goods (FMCG) sector. This paper examines the long-standing rivalry between Parachute, owned by Marico Limited, and Nihar Coconut Oil, previously owned by Hindustan Unilever Limited (HUL). The study explores how factors such as product positioning, pricing strategies, advertising, and distribution networks influenced competition between the two brands. Using concepts from competitive strategy, brand equity theory, and the resource-based view, the paper evaluates how both companies attempted to strengthen their market positions. Parachute maintained strong market leadership due to its trusted brand image, strong distribution reach, and consistent strategic focus. HUL attempted to challenge this dominance by promoting Nihar through aggressive pricing strategies and heavy advertising investments. Despite these efforts, Parachute continued to maintain its leadership position. Eventually, Marico acquired the Nihar brand in 2006, bringing an end to the direct rivalry. The case provides important lessons about brand loyalty, consumer trust, and the importance of long-term strategy in emerging markets.

Keywords: Marketing strategy, Competitive strategy, Customer Loyalty, FMCG Markets, Advertising and Marketing.

Introduction

Coconut oil plays an important role in Indian households and culture. It is widely used for hair care, skin care, cooking in certain regions, and even religious rituals. Because of these diverse uses, the coconut oil market has become a significant segment within the Indian FMCG industry. Over time, branded coconut oil products gained popularity because consumers became increasingly concerned about product purity and quality. Among the many brands in the market, two companies stood out: Parachute, produced by Marico Limited, and Nihar Coconut Oil, marketed by Hindustan Unilever Limited (HUL). The competition between these two brands gradually developed into one of the most notable brand rivalries in the Indian FMCG sector. Parachute positioned itself as a symbol of purity, trust, and tradition. Through consistent branding and packaging innovations, Marico successfully built a strong emotional connection with consumers. Nihar, on the other hand, relied on HUL's strong distribution network, marketing expertise, and aggressive promotional strategies to expand its presence in the market. The rivalry intensified during the late 1990s and early 2000s as both companies attempted to increase their market share through advertising campaigns, trade incentives, and retail expansion. Eventually, in 2006, Marico acquired the Nihar brand from HUL, which marked the end of this intense competition.

Theoretical Framework

This Study uses key Theoretical Perspectives to Understand the Competitive strategies

Used by the two firms.

Competitive Strategy and Industry Structure

Michael Porter's Theory of Competitive Strategy Explains that companies achieve competitive advantage through cost leadership, differentiation, or focus strategies. In FMCG markets, differentiation through branding, distribution network often becomes more sustainable than price-based competition.

Resource-Based View

The resource-based view suggests that firms gain sustainable competitive advantage when they possess valuable and difficult-to-imitate resources. In the case of Parachute, important resources included its strong brand reputation, supply chain efficiency and deep market understanding. HUL possessed strong financial resources and marketing capabilities, but these advantages were not enough to overcome Parachute's long-established trust.

Brand Equity Theory

Brand equity refers to the value that a brand name adds to a product. When consumers trust a brand, they are more likely to remain loyal and less sensitive to price changes. In traditional product categories such as coconut oil, trust and perceived purity play a critical role in shaping consumer preferences.

Industry Background

The Indian hair oil market has historically been dominated by coconut oil, particularly in southern and eastern regions of the country. Branded products gradually replaced loose coconut oil as consumers became more aware of quality and hygiene.

Marico invested heavily in improving packaging and introduced sealed bottles that helped reinforce the perception of product purity. This innovation helped the Parachute brand strengthen consumer confidence.

HUL entered the market with the Nihar brand and used its extensive distribution network and marketing strength to compete aggressively with Parachute.

Strategic Analysis of the Brand War**Product Positioning**

Parachute focused strongly on communicating purity, reliability, and tradition. This clear and consistent positioning helped the brand build strong mental associations among consumers. Nihar attempted to position itself as a reliable alternative with competitive pricing and strong availability. However, it struggled to build the same emotional connection with consumers that Parachute had already established.

Pricing and Trade Strategy

HUL adopted aggressive pricing strategies and offered attractive margins to retailers to push Nihar products in the market. While such strategies helped increase visibility, they were not enough to significantly change consumer loyalty toward Parachute.

Advertising and Communication

HUL invested heavily in advertising campaigns to promote Nihar. However, Parachute continued to maintain consistent messaging around purity and trust, which strengthened long-term brand recall among consumers.

Distribution Strategy

Distribution played a major role in this competition. Parachute had already built deep penetration in rural and semi-urban markets. Marico's focused approach allowed the company to develop strong relationships with retailers and distributors.

Acquisition And Strategic Outcome

After several years of intense competition, HUL decided to divest the Nihar brand in 2006. Marico acquired the brand, which allowed it to consolidate its leadership in the coconut oil market. This acquisition helped Marico eliminate a key competitor while also expanding its product portfolio and strengthening its market presence.

Conclusion

The rivalry between Parachute and Nihar represents a classic example of competitive strategy within the Indian FMCG sector. While HUL possessed strong financial and marketing capabilities, Marico's long-term strategic focus, brand equity, and strong distribution network helped Parachute maintain its

leadership position. The case demonstrates that in traditional product categories, consumer trust and brand heritage can be more powerful than aggressive marketing expenditure. The eventual acquisition of Nihar by Marico illustrates how companies sometimes resolve intense

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Role of Human Resource Development in Viksit Bharat**Prof. Gujar Kishor Shivaji**

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India is currently ranked second in the world in terms of population. So there is no problem of human resource. India has set an ambitious vision of becoming a “Viksit Bharat” (Developed India) by 2047, marking 100 years of independence. Achieving this vision requires not only economic growth but also social transformation, technological advancement, better health facility, institutional efficiency, and inclusive development. At the centred of this transformation lies Human Resource Development (HRD), which focuses on enhancing the knowledge, skills, competencies, health, and overall capabilities of the population. Human capital is a wealth of nation & is increasingly recognized as the most critical driver of sustainable development in the 21st century knowledge economy.

This research paper focuses on the role of Human Resource Development in achieving the goals of Viksit Bharat in 2047 marking 100 years of independence. It analyzes the conceptual foundations of HRD, its link with economic and social development, major government initiatives, structural challenges, and strategic recommendations for strengthening India’s human capital ecosystem. The paper concludes that without a robust and inclusive HRD framework, the vision of Viksit Bharat cannot be realized.

Keywords: Human Resource Development, Viksit Bharat, Human Capital, Skill Development, Education, Economic Growth, Inclusive Development, health facility.

Introduction

India has set an ambitious vision of becoming a “Viksit Bharat” (Developed India) by 2047, marking 100 years of independence. India is currently ranked second in the world in terms of population. So there is no problem of human resource. India stands at a crucial juncture in its developmental journey. With one of the largest youth populations in the world, the country possesses immense demographic potential. However, demographic advantage translates into economic dividend only when the population is educated, skilled, healthy and productive. The concept of “Viksit Bharat” envisions India as a developed nation characterized by high per capita income, advanced infrastructure, technological leadership, social equity, environmental sustainability, and strong global presence.

Human Resource Development plays a central role in achieving this transformation. In the modern global economy, natural resources and physical capital alone are insufficient for sustained growth and national development. Knowledge, innovation, productivity, and adaptability attributes rooted in human capabilities have become decisive factors. Therefore, strengthening education systems, expanding skill development, improving public health, and promoting innovation are essential pillars of national development. This paper aims to explore how HRD contributes to economic growth, social progress, technological advancement, health, and inclusive development in the context of Viksit Bharat.

Objectives of the Study

1. To examine the role of Human Resource Development in achieving Viksit Bharat.
2. To analyze the relationship between Human Resource Development and economic growth.
3. Identify major challenges in India’s Human Resource Development ecosystem.

4. Suggest policy recommendations to strengthen HRD for sustainable development.

Conceptual Framework of Human Resource Development

Human Resource Development refers to organized learning experiences and systemic efforts aimed at enhancing individual and organizational capabilities at the national level, HRD includes:

- Formal and higher education
- Vocational and technical training (OJT)
- Skill development initiatives
- Public health and nutrition
- Digital literacy & technological competence
- Research and innovation capacity
- Gender empowerment and social inclusion

The Human Capital Theory suggests that investments in education and health increase productivity and earnings, thereby contributing to national income growth. Modern development economics also emphasizes that countries with higher literacy rates, technical skills, and innovation ecosystems experience faster and more sustainable development. HRD is not limited to employability alone. It encompasses holistic development, including critical thinking, creativity, entrepreneurship, ethical values, and leadership skills. For Viksit Bharat, HRD must integrate economic productivity with social responsibility and global competitiveness.

• Literature Review

Several economic and social theorists have highlighted the importance of human capital in national development. Studies show that countries with higher investments in education and research exhibit stronger economic performance. East Asian economies, for instance, achieved rapid growth through skill-intensive industrialization supported by strong education systems.

Research also indicates that demographic dividend can become a demographic burden if adequate employment opportunities and skill development mechanisms are absent. In developing economies, skill mismatches and unemployment often coexist due to inadequate alignment between education and industry needs.

Recent policy analyses emphasize digital transformation and innovation-driven growth as key determinants of development. Therefore, HRD strategies must focus not only on literacy but also on digital competence, research orientation, and entrepreneurial capacity.

• Methodology

This study is conceptual and analytical in nature. It is based on secondary data sources, including research articles, policy reports, government publications, and economic analyses. The paper adopts a qualitative approach to examine the relationship between HRD & national development goals.

• Role of Human Resource Development in Viksit Bharat

HRD and Economic Growth

Economic growth in the 21st century is knowledge-driven. Skilled workers contribute to higher productivity, technological adaptation, and innovation. Countries investing in technical education, research, and vocational training experience industrial diversification and global competitiveness.

For India, strengthening manufacturing, services, digital economy, and green technologies requires a skilled workforce. HRD enables increased labour productivity, Attraction of foreign investment, Growth of start-ups and entrepreneurship and Global integration through skilled exports.

A developed India must transition from low-skill, low-wage employment to high-skill, high-value industries.

HRD and Demographic Dividend

India has a large working-age (youth) population. If adequately educated and trained, this demographic structure can accelerate growth. However, without proper skill development, unemployment and underemployment may increase social instability. Human Resource Development ensures Employability enhancement, Youth empowerment, Reduction in poverty and Social mobility.

Transforming demographic potential into economic strength requires targeted skill development and job creation strategies.

Education and Knowledge Economy

Quality education forms the foundation of HRD. Primary education builds literacy and numeracy, while higher education fosters research and innovation.

A knowledge-based economy depends on STEM education (Integrated education of four subject like Science, Technology, Engineering & Mathematics), Research institutions, Innovation ecosystems and Industry-academia collaboration.

To achieve Viksit Bharat, education must shift from rote learning to skill-oriented and outcome-based learning.

Skill Development and Employability

Skill development bridges the gap between education and employment. Many graduates remain unemployed due to skill mismatches. Vocational education & apprenticeship programs are critical for Enhancing employability, supporting industrial growth, Promoting entrepreneurship and strengthening the informal sector.

Industry-aligned training programs ensure that workforce capabilities meet market demands.

Digital Transformation and HRD

Digitalization is reshaping global economies. Artificial intelligence, automation, robotics, and data analytics require new-age skills. HRD strategies must incorporate Digital literacy programs, IT and coding skills, Cyber-security training and Digital entrepreneurship.

Without digital competence, India risks widening inequality in the digital age.

Health and Human Productivity

Health is an essential component of human capital. Malnutrition, poor healthcare access, and disease reduce productivity and economic output. Investments in Public health infrastructure, Preventive healthcare, Maternal and child health and mental health awareness are essential for a productive workforce.

Social Inclusion and Gender Equality

Inclusive HRD ensures participation of women, marginalized communities, and rural populations. Gender equality in education and employment increases labour force participation and economic growth. Social inclusion strengthens national unity and reduces inequality.

Government Initiatives Supporting HRD

India has introduced several initiatives focused on education reform (NEP-2020), skill development, digital transformation (digital-India), and health improvement. These initiatives aim to modernize curriculum and pedagogy, Promote vocational education, Encourage research and innovation, Expand digital infrastructure and Improve healthcare delivery

Policy reforms emphasize outcome-based education, skill certification, entrepreneurship promotion, and technological integration.

• Challenges in Human Resource Development

- Despite progress, several challenges hinder (obstacles) in effective HRD:
- Quality of Education - Many institutions face infrastructure gaps, teacher shortages, and outdated curricula.
- Skill Mismatch - Educational output often does not match industry requirements.
- Regional Disparities - Rural areas lack access to quality education and healthcare facilities.
- Digital Divide - Limited internet access and digital literacy restrict opportunities.

- Gender Inequality - Women's labour force participation remains comparatively low.
- Brain Drain - Highly skilled professionals often migrate abroad for better opportunities.

Addressing these structural issues is essential for realizing Viksit Bharat.

Recommendations: To strengthen HRD for Viksit Bharat, the following measures are recommended:

1. Increase public expenditure on education and healthcare.
2. Promote industry-academia collaboration.
3. Expand vocational and apprenticeship programs.
4. Integrate digital skills at all educational levels.
5. Encourage research and innovation through funding and incentives.
6. Strengthen rural education infrastructure.
7. Promote gender equality and inclusive workforce participation.
8. Establish global centers of excellence in higher education.
9. Develop lifelong learning systems to adapt to technological change.

Conclusion

Human Resource Development is the cornerstone of Viksit Bharat. Economic growth without human development leads to inequality and instability. A skilled, educated, healthy, and innovative population is essential for sustainable development.

India's demographic strength offers a historic opportunity. However, this opportunity must be supported by strategic investments in education, skill development, healthcare, and digital infrastructure. HRD is not merely a policy area; it is a national mission. Achieving the vision of a developed India by 2047 requires transforming human potential into productive capacity.

Therefore, strengthening Human Resource Development is not optional—it is fundamental to building a prosperous, inclusive, and globally competitive Viksit Bharat.

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Financial Systems and Economic Reforms as Foundational Pillars of Viksit Bharat 2047: A Strategic and Practitioner-Led Analysis

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Abstract

India's aspiration to transform into a developed nation by 2047, marking the centenary of its independence, is a vision encapsulated in "Viksit Bharat". This objective is not merely symbolic but is structurally aligned with demographic opportunities, the mathematics of compounding economic growth, infrastructure gestation cycles, and institutional evolution. Achieving this requires a robust framework of economic resilience, institutional integrity, and equitable growth. Financial systems—comprising taxation reforms, digital public infrastructure, financial inclusion, and regulatory modernization—serve as the primary catalysts for this transition. This paper evaluates these pillars by synthesizing policy developments with grassroots practitioner insights, addressing implementation hurdles such as compliance density, financial literacy gaps, and the transition from the informal to the formal economy. It concludes that integrated financial reforms, institutional stability, and professional accountability are indispensable for achieving an equitable and globally competitive India by 2047.

Keywords: Viksit Bharat 2047, Financial Systems, Economic Reforms, Digital Public Infrastructure, MSME Empowerment, Chartered Accountancy.

1. Introduction

The vision of Viksit Bharat 2047 represents India's long-term developmental aspiration for social justice, institutional excellence, and global leadership. Financial systems form the backbone of this economic transformation by enabling efficient capital allocation, risk management, and institutional trust. Over the past decade, India has accelerated structural reforms in taxation, digital governance, and financial inclusion. The Union Budget 2026 signals a continuity of these reforms, pivoting from immediate fiscal management to long-range structural evolution. This paper examines these foundational pillars through a practitioner's lens to bridge the divide between legislative intent and real-world outcomes.

2. The Strategic, Demographic, and Structural Logic of 2047

The selection of the year 2047 as the benchmark for India's transformation is strategically aligned with economic and institutional realities. While the centenary of Independence provides a powerful instrument for national mobilization and "Jan Bhagidari" (public participation), the deeper logic lies in structural transformation cycles.

2.1 The Demographic Dividend Window

India's demographic dividend is expected to peak between 2025 and 2045. Leveraging this large working-age population through skill development and financial deepening is essential for sustained productivity. If this window is missed, the nation will eventually face aging population pressures; thus, 2047 aligns with the culmination of this demographic opportunity.

2.2 The Mathematics of Compounding Growth

Economic development is governed by the principle of compounding. At a sustained real GDP growth rate of 6–8 percent, per capita income can double approximately every decade. Over a twenty-year period, income levels can potentially triple, enabling the transition toward high-income status as defined by World Bank classifications. Shorter timelines often ignore the mathematical realities of capital accumulation and structural maturity.

2.3 Infrastructure and Institutional Transformation

Cycles Major investments in logistics, green energy, and digital architecture typically require 10–15 years to produce measurable multiplier effects. Furthermore, building a compliance culture and institutional trust requires generational change. The 21-year roadmap corresponds to a complete cycle of infrastructure

build-out and institutional maturation. Currently, India is in an "Advanced Take-Off" phase, moving toward maturity, which requires at least two decades of sustained reform to reach the status of a developed economy.

3. Evolution of India's Economic Framework

India's reform journey has been a dynamic response to domestic needs and global shifts. Key milestones include the implementation of the Goods and Services Tax (GST), the expansion of digital public infrastructure (DPI), and deep financial inclusion initiatives.

3.1 Fiscal and Taxation Resilience

The GST was a landmark move to unify the indirect tax structure, aimed at enhancing compliance and reducing economic friction. Recent policy, including the Union Budget 2026, prioritizes trust-based compliance and simplification for the taxpayer. These reforms have enhanced transparency and accelerated the formalization of the economy.

3.2 Digital Public Infrastructure (DPI) and the JAM Trinity

India's DPI has become a global benchmark for efficiency. The integration of Jan Dhan bank accounts, Aadhaar, and Mobile connectivity (the JAM Trinity) has effectively removed intermediaries from the welfare system. Subsidies now reach citizens instantaneously via Direct Benefit Transfer (DBT), ensuring zero leakage and improved fiscal targeting. Every digital transaction acts as a building block for the national financial pillar.

4. Financial Systems as Pillars of Development

The efficiency of a financial system—comprising its markets, institutions, and regulators—dictates national economic stability.

4.1 MSME Empowerment and the ONDC Advantage Micro, Small, and Medium Enterprises (MSMEs) are the engines of regional development. Current reforms are enabling local businesses in regions like Satara to access global markets. The Open Network for Digital Commerce (ONDC) is democratizing the digital marketplace, allowing small-scale artisans to compete with multinational brands. Furthermore, there is a professional shift toward cash-flow-based lending, which focuses on a business's digital transaction history rather than heavy collateral requirements.

4.2 Capital Formation and Social Inclusion Sustainable development requires consistent investment in human capital and infrastructure. Modern financial systems channel long-term savings into these productive sectors. This inclusive approach ensures that the fruits of growth are shared across all social demographics, securing an equitable transition to a developed state.

5. The Practitioner's Perspective: Bridging the Gap

From the professional vantage point of a Chartered Accountant (CA), the efficacy of any reform is determined by its execution quality at the grassroots level.

5.1 The Compliance Hurdle While digitalization has increased the speed of transactions, the "density" of regulation remains a challenge. For a micro-enterprise in towns like Wai or Satara, frequent changes in tax slabs and reporting formats create a state of perpetual flux. These businesses often lack the administrative bandwidth to keep pace with evolving regulations, making the cost of professional compliance a potential deterrent to formalization.

5.2 The CA as a "Financial Soldier" The role of the CA has evolved from a "tax filer" to a strategic "Financial Soldier" and mentor. CAs serve as intermediaries between the state and citizens, helping the youth (Yuva) navigate startup valuations and assisting farmers (Annadata) in adopting digital tools to track profitability. As guardians of the economic system's integrity, they ensure transparency and protect against fraud, ensuring that wealth creation does not compromise the national interest.

5.3 Behavioural Change and Financial Literacy Perhaps the greatest challenge is the uneven nature of financial literacy. While millions now have bank accounts, many lack an understanding of concepts like the power of compounding for long-term wealth preservation. Overcoming behavioural biases, such as

the preference for physical gold over formal financial instruments like mutual funds, is a prerequisite for channelling domestic savings into national infrastructure.

6. Navigating Risks and Future Challenges

The journey toward 2047 requires addressing deep-seated structural hurdles.

1. **Administrative Burden:** High operational costs and regulatory fluidity may discourage small businesses from fully entering the formal sector.
2. **Informal Economy:** A large portion of rural activity remains outside the formal net, requiring a fundamental transition from subsistence-driven activity to productivity-led growth.
3. **Cybersecurity:** As the nation adopts a digital-first architecture, the risk of cyber-fraud and data breaches increases. A lack of trust in digital security could undermine years of progress in financial inclusion.

7. Strategic Recommendations

To ensure reforms translate into sustainable prosperity, coordinated efforts are required across three levels:

- 7.1 **Policy Level** The government should stabilize compliance frameworks to reduce the "compliance-to-turnover" ratio for small enterprises. Additionally, financial education must be embedded into the national curriculum to prepare the youth for a digital economy and prevent future poverty through early understanding of risk.
- 7.2 **Institutional Level** There is a critical need to bolster digital security to maintain the integrity of national infrastructure. Furthermore, empowering cooperative and regional financial institutions is essential to ensure that the benefits of Viksit Bharat reach every taluka and rural hub.
- 7.3 **Professional Level** Financial professionals must expand their advisory roles, guiding businesses through risk management and ethical growth. CAs should actively lead grassroots capacity building, supporting small businesses and farmers in adopting technology to access global markets.

Conclusion

Financial systems and economic reforms constitute the foundational pillars of Viksit Bharat 2047. The 2047 timeline is not merely aspirational rhetoric; it is an economically realistic window aligned with demographic opportunities and institutional evolution. Viksit Bharat is fundamentally a "People's Movement" (Jan Bhagidari). When citizens adopt formal savings and pay taxes, they are directly investing in the schools, infrastructure, and services that define a developed nation. By transitioning from "Informal and Isolated" to "Formal and Integrated," India will secure its place as a prosperous, equitable, and globally competitive leader by its centenary year of independence.

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Digitalisation of E-Commerce and E-Banking in the Vision of Viksit Bharat: An Analytical Study

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Abstract: -

The real digital transformation in India started after 1991, when the government adopted the LPG system, after which the use of facilities like E- Commerce and E- Banking started on a large scale. With the adoption of E- Commerce, E- Banking and E- Governance in the Indian Economy, trade, industry, financial system, administrative system, consumer behavior, we are on the way to achieving the comprehensive vision of a Viksit Bharat and a developed Indian economy, which is an economic digital revolution. If we consider the concept of a developed India, then the use of modern technology, the inclusive growth in digitalization, developed financial technology (FinTech), privacy, transparency, efficiency and innovation are important. This study paper studies the various stages of the evolution of modern financial structure, E-Banking, E-Commerce, digitalization in India and its impact on the economy, challenges, opportunities and policy implications. Using secondary data from Reserve Bank of India publications and policies, government reports, international organization reports, budget analysis, financial newspapers and magazines, digital sources, this paper analyzes how E-Banking, E-Commerce, digital financial systems contribute significantly to today's advanced economy. The findings of this paper show that digital banking, Internet banking, E-Commerce systems and comprehensive modern banking and commerce are essential for India's financial inclusion, growth, strengthening the financial system, promoting tiny, small and medium enterprises, providing scope for heavy industries, rapid growth in service sectors and accelerating per capita income, GDP and GNP growth. However, in this modern financial revolution, security threats, lack of digital literacy, regulatory weakness of regulatory bodies, cyber-attacks, fraud etc. also arise, which required a major need for legal and proper security attention on them.

Keywords: LPG, E-Commerce, E-Banking, Viksit Bharat, Digitalisation, Digital Economy, E- Governance, FinTech, Per Capita Income, GDP, GNP.

1) Introduction: -

India's long-term plan of developed India aims to upgrade the nation into a well-established economy marked by rapid growth, Innovation, Creativity in production and services, technical advancement, strong infrastructure, Digital transformation, balanced prosperity and sustainable long-term development. Modernization and Digitalization plays a very vital role in accomplishing this up gradation. After accepting LPG reforms significant changes were observed in the Indian Economy during the 2000, India has observed better growth and development in modern infrastructure, digital advancement and infrastructure, Internet connectivity, mobile facilities, better Network across nation, online platforms, Digital Facilities etc.

E-commerce very easy term that denotes to the purchasing and selling of products, goods, commodities and services through electronic platform, basically the internet. E-banking, also known as Internet banking, online banking, digital banking, mainly its known as Electronic banking that allows public to complete financial activity, transaction with the help of electronic, Internet and mobile structure or digital space without attending physical bank branches or offices. Central Government promoted programs such as the Skill India, make in India, Digital India, Green India and financial integration schemes and programs such as Core banking, Digital banking, NEFT, RTGS, IMPS, virtual banking and e-cash have significantly increased the scope of E-Commerce, E-Banking, Online Banking.

The rapid growth of electronic systems and digital Structure has changed the old and traditional financial system by increasing effectiveness, efficiency, quality, good governance, ethical values, universal access and service reach. This research paper shows that the assessment of e-banking and e-commerce in finding journey of Indian economy toward the target of achieving a developed economy and nation.

2) Objectives of the Study: -

The primary objectives of this research are:

- a) To find the development of e-commerce and e-banking in India.
- b) To allocate their role in the vision of developed India.
- c) To assess major challenges and risk associated with electronic, digital development.
- d) To give policy related opinion for continuous digital platform growth.
- e) To find scope of innovation in Commerce and banking.

3) Review of Literature: -

Various studies focus on the importance of E-Commerce and E-Banking in enhancing Financial and economic development. As per report of NITI Aayog, advanced and digital infrastructure is a fundamental element of India's economic development strategy. Now Small companies, businesses get large market and marketplaces due to adopting Online Businesses, E-Commerce and E-banking platform facilities they reduce geographical limitations and heavy supply chain management burden.

Analysis on E-Commerce and E-Banking shows that its result on economic, financial integration. Reports of Reserve Bank of India (2023) shows that online, digital or electronic payment transaction amount have grown rapidly due to mobile banking, online banking and online transfer systems such as by using UPI, BHIM and UPI apps. Research and Study indicates that online banking reduces transaction costs, expenses and increase service efficiency (World Bank, 2021).

So, this research paper also finds some problems like a fraud, online risks, data privacy, bugs and errors and mainly cybersecurity issues. OECD (2020) reports tell the need for powerful regulatory rules, regulation structure and platform for protecting Customers and ensure trust on digital banking and E-Commerce. So, digital banking and E-Commerce increases financial and economic effectiveness, these platforms have need of strong regulatory governance, cybersecurity measures and technological safety protocols.

4) Research Methodology: -

This study reports applies an analytical and descriptive research design. It is totally based on recorded information in various reports so following are secondary data sources, including:

NITI Aayog policy Reports, Documents.

1. RBI annual reports publications.
2. Government of India (GOI) reports.
3. World Bank digital economy reports.
4. Data analysis is conducted by using qualitative research technique. The research Paper combines present statistical patterns and policy structures to assess the larger effect of digitalisation.

5) Development of E-Commerce in India: -

5.1 Rise of Digital Markets/ E-Commerce

The expansion of internet networks and smartphone, tablets usage has widely increased India's digital/e-commerce sector. Digital infrastructure connects with producers, sellers, and buyers across to the world, nations. As per the reports of Ministry of Commerce and Industry (2023), online retail participation of buyers and sellers has increased beyond metro cities (Mumbai, Delhi, Kolkata, Bengaluru, Chennai, Pune, Hyderabad, Ahmedabad) to tier-2 and tier-3 cities and semi urban areas.

5.2 Promotion of MSME Sector

Due to digital platforms Micro, Small, and Medium Enterprises (MSMEs) have widely promoted in global as well as national markets. Digital/Online markets decreases promotional and Distribution and entire marketing expenses and eliminate distributors. So, result is improving profit abilities, efficiency and competitive market Strengths.

5.3 Job Creation

The E-Commerce ecosystem creates many Job opportunities in Delivery Partners, warehousing and Inventory, Advertising, digital marketing, customer support, Payment processing, information technology, packaging and data analytics. Due to lot of job creation in E-Commerce field that's result is national economic growth, financial stability and increase in skill development.

5.4 Benefits for Consumers

E-Commerce improves consumer user friendliness and effectiveness through online product comparison, price comparison, Product/Services features Comparison, transparent reviews, Customer feedback, and home, office delivery services. E-commerce improves competition, quality and price efficiency in today's market structure.

6) Growth of E-Banking in India: -**6.1 Financial empowerment**

Digital banking/E-Banking has increases access to financial, economical services for remote, rural and banking deprived populations. The reports of Reserve Bank of India (2023) shows that mobile banking transactions, UPI transaction have increased rapidly and enhancing comprehensive growth.

6.2 Financial Efficiency and Productivity

E-banking reduces running costs, day to day expenses, operating costs for banking institutions by reducing physical bank branches, offices. Modern digital payment systems enhance transaction speed and minimize mistakes and errors.

6.3 Online Payment Framework

Indian economy has created a strong online payment ecosystem that promotes UPI transaction, cashless transactions. Online fund transfers, e-wallets, mobile wallets app, digital banking apps, and online banking systems creates banking financial transparency and reduce physical cash transactions and reduce cash holding in wallets or pockets (World Bank, 2021).

6.4 Good banking Governance and Transparency

Digital banking systems provides good banking governance and transparency in online transaction records, increases financial accountability and reducing errors, frauds, mistakes corruption risks. Due to Good banking Governance institution can maintain transparency and accountability.

7) Contribution of E-commerce, E-Banking in Viksit Bharat: -

E-commerce, E-Banking play very vital role in contributing economic growth and national development in many ways-

1. Increasing GNP/ GDP growth through E-commerce expansion.
2. Motivating Institutions, entrepreneurship Creativity and innovation.
3. Improving trade, commerce, business, and banking efficiency.
4. Promoting banking and Commerce Contribution in economy.
5. Increasing good governance transparency and cybersecurity.

Reports of NITI Aayog (2022) shows that digital platforms support systematic financial reforms needed for sustainable financial development. The effect of collaboration of technology and digitalisation into economic systems, India increases competitive advantage in global economic market.

8) Problems in Digitalisation: -**8.1 Cybersecurity Threats**

Digital systems face Cybersecurity Threats our systems exposed to cyber-attacks, Information leaks, data theft, fraud, bugs, and virus. OECD (2020) shows the importance of improving cybersecurity platforms, tools and software's to increasing trust in online ecosystems.

8.2 Technological/Digital Divide

Despite Technological/Digital development we find lack of internet access, lack of digital infrastructure and lack of digital literacy. Rural, semi urban populations frequently face network issues, connectivity issues, Internet speed issues, reducing participation in technological digital markets.

8.3 Regulatory Control and Policies

Fast digital technological growth needed continuous regulatory Control and policy updates. Rules, Regulations, Data protection, Business laws, consumer protection laws, Information Technology laws, consumer rights, and global trade regulations must be clearly defined.

8.4 Limited Infrastructure

Fast, reliable internet network connectivity and safe digital infrastructure are required for continuous growth of Digitalisation.

9) Suggestions: -

1. To improve and expand digital technologies, systems to supports the achieving goal of Viksit Bharat:
2. Make complete broad cybersecurity strategic framework.
3. Arrange digital and financial literacy activities in semi-urban, rural and remote areas.
4. Increase fast and secure Internet network, Broadband and digital infrastructure.
5. Improve data security, data protection and privacy policies and Cyber laws.
6. Encourage to creativity, innovation in Financial Technology and E-Commerce and digital entrepreneurship.

Conclusion: -

Technological advancement in e-commerce and e-banking is an innovative strength in India's financial and economic development. These structures improve effectiveness, efficiency, integration, creativity, Innovation and transparency. These factors are basic, foundational frameworks in getting the vision of Viksit Bharat. Although problems have arisen in cybersecurity and digital Threats, long term policies, programs, methods and digital advancements can ensure continuous technological improvement. India's advanced digital change is not only technological change but a systematic sustainable economic and financial development in shaping its way toward modern and developed nation status.

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The Study of Analysis of the Investors Attitude, Preferences and satisfaction Level Towards Investment in Satara District

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Abstract:

This study shows about investment in Satara district. What is investors attitude, preferences and satisfaction level towards an investment. This study gathered information from primary as well as secondary sources. Taken survey from general public and they provide information about their preferences and choices towards investment. Books Magazines, provide valuable information about study. Based on research concerning investment preferences in similar regions, studies on investor attitude and satisfaction often analyse how demographic factors (age, income, occupation) influence choices regarding [financial assets](#) like mutual funds, gold, and real estate. Such studies typically aim to measure satisfaction levels with returns and identify factors impacting investment decisions, often revealing a preference for safe, long-term wealth creation, especially among individual investors

Introduction-

This study focuses on what are the investment opportunities in India's and how peoples are react towards an investment. From this study we analysis of investors attitude, preferences and satisfaction Level towards investment in Satara district. This study influencing their choices like risk, return, liquidity, tolerance level of losses, rewards, safety etc. The study focuses investors preferences, objectives, growth, diversification of investment, risk capacity through the primary data collection and secondary data collection. Investment refers to the act of putting money or resources into something with the expectation of gaining a profit or benefit in the future. It involves committing funds into assets, projects, or financial instruments with the goal of increasing wealth or achieving specific financial objective.

Review of the literature - Books, Magazines, Bank Websites, Mutual Fund companies' website etc, Govt schemes etc, articles etc.

Objectives: To study of an opportunity of investment in India.

- : To study of analysis of the investor's preferences, attitude and satisfaction level towards an investment.
- : Risk Level in the investment

Research Methodology:

Primary Data- Questionnaires.

Secondary data- Financial Institutions websites.

Structure of Questionnaires: 1) Direct Questions 2) Close ended Questions 3) Multiple Choice Questions.

Statement of the problem: Investment is an activity that is engaged in by people who have savings or in other words investment are made from savings. The prosperity of an economy is closely linked with the ability of the public to save and invest in productive assets for an uninterrupted supply of capital. This study identifies Investors Attitude, Preferences and satisfaction Level Towards Investment in Satara District

Sources of Investment:

Authorised Sector: Authorised sector investment refers to industry segments where the government permits, regulates, or encourages capital inflow (often Foreign Direct Investment - FDI). These permitted sectors,

such as manufacturing, technology, or agriculture, have specific, approved limits, guidelines, and, in some cases, require government approval, as opposed to prohibited sectors.

Instruments: Bank Deposits, Stock Market, Mutual Fund Companies, Commodity Market, Forex Market, Govt Securities, Debt Market (Debentures/ Bonds), Insurance, Pension Schemes, Govt Schemes, Real Estate.

Unauthorised Sector: An unorganised sector investment refers to putting money into small-scale, unregistered, or informal businesses (like street vendors, small retail, or uncontracted labor) that operate outside formal government regulations. These investments lack formal legal protection, and social security, often relying on personal savings, and are characterised by high risk, instability, and limited access to formal credit.

Instruments:

Crypto Currency, Chit Fund Companies Investment, Investment in Ponzi schemes.

Safe/Low Risk Instruments: Bank Deposits, Govt Securities, Insurance, Pension Schemes, Govt Schemes Real Estate.

Moderate Risk Instruments: Mutual Fund Companies, Debt Market (Debentures/ Bonds)

High Risk Instruments: Stock Market, Commodity Market, Forex Market, Crypto Currency, Chit Fund Companies Investment, Investment in Ponzi schemes.

Fixed Returns Instruments: Bank Deposits, Insurance Schemes, Debt Market, Govt Securities,

1	2	3	4	5	6	7	8	9	10
Very low-risk investor		Low to medium-risk			Medium to high-risk			Very high-risk	
Investments guaranteed not to fall but are unlikely to increase more than inflation		Potential for moderate to good investment growth in the long term, but with the possibility of some fluctuation in investment value over the term			Potential for higher investment growth than for a medium-risk investment but equally a higher risk of some investment loss.			Very risky, speculative investment that could result in high returns, but possibility of losing all money invested	
Deposit accounts and government-backed securities such as gilts		Investment in lower-risk equities, passive investments with a low equity content			Investment in higher-risk equity markets, passive investments containing high equity content.			High-risk investments such as business start-ups, mineral exploration or unlisted shares.	

This model helped me for collect information from general public. I categorised investor as per this chart. It helped me for enhance knowledge about particular study. I created survey from using this model.

Questionnaires:

1) Age of Investor:

a) 18-30 Years b) 31-40 Years c) 41-60 Years d) above 60 Years.

2) Gender: a) Male b) Female

3) Nature of Employment:

a) Business b) Profession c) Self Employment d) Service d) other

4) Annual Income Level:

a) below 2.5 lakh b) 2.5 lakh – 5 lakh c) 5 lakh- 10 lakh d) 10 lakhs

- 5) do you have adequate knowledge about the various investment?
a) yes b) no
- 6) What are the objectives behind your savings?
A) Good Return b) Future Security c) Capital Gain d) Liquidity e) Beat the inflation f) profitability.
- 7) what investment instruments do you currently invest in?
a) Bank Deposits, Govt Securities, Insurance, Pension Schemes, Govt Schemes,
b) Stock Market, Mutual Fund Companies, Commodity Market, Forex Market,
c) Debt Market (Debentures/ Bonds), Real Estate.
d) Crypto Currency, Chit Fund Companies Investment, Investment in Ponzi schemes.
- 8) Has your investment been satisfactory:
a) Most Satisfactory b) Satisfactory c) Neutral d) Disappointed
- 9) What is your source of investment advice:
a) Newspapers b) News channels c) Internet d) family or friends e) Books.

Findings:

- 1) Age category who belong at the age of 31-40 Years are more preferable for do investment in various instruments.
- 2) Investors given preference to invest in low risky instruments like a bank's deposits, govt schemes, mutual fund companies, real estate,
- 3) only few investors are invested in stock market, mutual fund companies, forex market.
- 4) Risk tolerance level is very low of investors.
- 5) Satisfaction level is neutral from investment because of they expected low risk high reward.
- 6) Internet is source of investment advice for investors.

Suggestions:

- 1) Investor should do proper study before investing.
- 2) Investor having well knowledge before investing.
- 3) Invest of money with own analysis
- 4) diversified their investment in various instruments.

Conclusion:

Through the Primary data collection and Secondary data collection well understood investors Attitude, Preferences and satisfaction Level Towards Investment in Satara District” Investors attitude is taking low risk and expected to high reward. And investors prepare low risk instruments like a bank's deposits, govt schemes, mutual fund companies, real estate etc. Investor satisfaction level is a neutral.

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A Study on Growth and Challenges of Women Entrepreneurship in Maharashtra**Ms. Landge Seema Eknath**

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Email ID-seemalandgepace@gmail.com**Abstract-**

Women who start their businesses are very important for the economy of Maharashtra. Maharashtra is one of the industrialized states in India and it has seen a lot of growth in businesses owned by women especially in the small and medium sized businesses and service industries. This study uses information from reports like the MSME Annual Reports, the Economic Survey of Maharashtra from 2023 to 2024 reports from the Reserve Bank of India publications from NITI Aayog and reports, about government schemes. The study looks at how women entrepreneurship's growing what problems women who start businesses face and what the government is doing to support women entrepreneurship in Maharashtra, particularly women entrepreneurship. Women entrepreneurship is really taking off in 2024, which great. Even with this progress women who want to start their own businesses still face a lot of problems. They do not have money they are not very good at using computers and the internet and they have a lot of work to do at home.

Key Words-

Women Entrepreneurship, Maharashtra, MSME, Financial Inclusion, Government Schemes, Economic Development, Digitalization.

Introduction-

Women are very good at starting their businesses and this is really important for the economy. When we talk about women entrepreneurship we are talking about businesses that are owned and run by women. In the state of Maharashtra women are getting more involved in businesses like shops making food making clothes, handicrafts, beauty services, schools and new startups. Women entrepreneurship is a part of this as women are starting their own businesses, like shops and schools and even new startups. Women are doing a job of making food, clothes and handicrafts and they are also providing beauty services. Women entrepreneurship is playing a role, in the state of Maharashtra as more and more women are starting their own businesses. Women entrepreneurship is helping to create jobs and make things, which is very good, for everyone because women entrepreneurship is making a big difference and women entrepreneurship is very important. Women are doing well in Maharashtra. They are starting their businesses. Women are making these businesses very successful. This is a thing for women and for women entrepreneurship. Women entrepreneurship is getting a boost because of this. Women in Maharashtra are taking the lead, in women entrepreneurship.

The government has started some programs like Mudra Yojana, Stand-Up India, Startup India and Skill Development Programs to help women. They have a program called MAVIM, which's short for Mahila Arthik Vikas Mahamandal. These programs are really good because they help women start their businesses and make them successful. Women can now make their businesses bigger. Now we have a lot of platforms and e-commerce on the internet it is like a store. This has given women who want to start their businesses a lot of new chances. The Mudra Yojana and Startup India programs are especially helpful for women who want to start their businesses. Women can use these programs to make their businesses successful and earn an income. The government programs like Mudra Yojana, Stand-Up India and Skill Development Programs are very helpful, for women. Women are having a time even when good things are happening. Women are still facing a lot of problems. For example women have trouble getting money to start their businesses. Women entrepreneurs often have a time. They do not get the support they need from people. The thing is, women entrepreneurs do not know much about computers and technology. This makes it hard for women entrepreneurs to make their businesses bigger and better. Women entrepreneurs have to figure out how to use

computers and technology every day. It is really hard for women entrepreneurs to deal with these problems all the time. Women entrepreneurs face these kinds of challenges daily.

Importance of this study-

Women entrepreneurship is a way for everyone to have a chance to grow and do well in the economy. It is good for women who start their businesses because they can help make the economy fairer. This means everyone can succeed. Women entrepreneurship is really good for the economy. It helps women get the jobs and money they need. They can take care of themselves and their families.

Women entrepreneurship is very important. By supporting women entrepreneurship we can make the economy better for everyone, women. Women entrepreneurship helps to create jobs in places, like Maharashtra. It is good for women. It is good, for the economy. Women entrepreneurship is a thing. The people of Maharashtra really benefit from this because it creates jobs in Maharashtra. This is really good for women in Maharashtra because it helps them to be strong and make their money. Women can be free to do what they want with their money. This supports women empowerment. Helps women to be financially independent. Women empowerment is very important for the women of Maharashtra. This is about giving women the power to be independent, with their own money. This helps the policymakers to see the problems that already there in Maharashtra.

Objectives of the Study-

1. To examine the growth of women entrepreneurship in Maharashtra.
2. To identify the major challenges faced by women entrepreneurs.

Research Methodology-

This study is Descriptive and Analytical Research this study is mainly based on primary and secondary data collected from authentic government sources. The data has been obtained from the Ministry of MSME Annual Report (2023–24), Economic Survey of Maharashtra (2023–24), RBI Annual Report (2023–24), and NITI Aayog Reports (2024). In addition, scheme-specific reports such as PM Mudra Yojana (2023–24), Stand-Up India (2024), and MAVIM Annual Report (2023–24) have been used.

1.To examine the growth of women entrepreneurship in Maharashtra.

The main thing we want to find out is how many businesses in Maharashtra are owned by women compared to before. I think it is great that more women are starting their businesses, like small shops or companies from 2015 to 2024. Women-owned businesses are becoming really common these days. I want to know the reason why this is happening. Women-owned businesses are getting more common because women are starting their small and medium businesses. We also want to know how the internet and online shopping have made it easier for women to start their businesses especially after 2020. Women starting their businesses is a good thing and women entrepreneurship is important, for women. We want to find out how digitalization and e-commerce platforms have helped women-owned businesses. We also want to know if the government programs and financial help they get really work. Our main focus is on women-owned MSMEs. We want to understand what helps them and what does not help them. It looks at how women-owned MSMEs in areas are growing compared to women-owned MSMEs in rural areas to see if there are any differences, in how they are developing. This study wants to figure out how women starting their businesses helps create jobs and improves the economy in Maharashtra. Women entrepreneurship is really important for the economy of Maharashtra. It helps with employment generation. The goal is to see how women entrepreneurship affects the economic development, in Maharashtra.

Growth of women entrepreneurship in Maharashtra

Sr. No	Year	Growth Percentage
1	2015	12%

2	2018	15%
3	2020	18%
4	2023	21%
5	2024	24%

(Reference- MSME Annual Report 2023–24, Economic Survey of Maharashtra 2023–24.)

The table shows that women-owned businesses are really taking off. In 2015 women-owned businesses were 12 percent. Women-owned businesses made up a small part of the total businesses back then. By 2024 the number of women-owned businesses increased to 24 percent. The number of women-owned businesses and women-owned MSMEs really started to grow a lot after 2020. Women-owned businesses are still growing and women-owned MSMEs are doing well too. This happened because of digitalization and financial inclusion initiatives that helped women-owned businesses. The steps taken after the pandemic helped women-owned businesses a lot. This is a sign for women who want to start their own businesses in Maharashtra. Women entrepreneurship in Maharashtra is really taking off. Women entrepreneurship, in Maharashtra is getting stronger every day.

2.To identify the major challenges faced by women entrepreneurs.

Women entrepreneurship in Maharashtra is also affected by the things women have to do for their families and society. Women entrepreneurs in Maharashtra have a lot of work to do at home. They have to take care of their communities too. This means Women entrepreneurs in Maharashtra do not have a lot of time to think about their businesses. Women entrepreneurs in Maharashtra also have a time moving around to do the things Women entrepreneurs, in Maharashtra need to do for their businesses. Women who want to start their businesses in Maharashtra need to learn how to do things like manage money and make good choices.

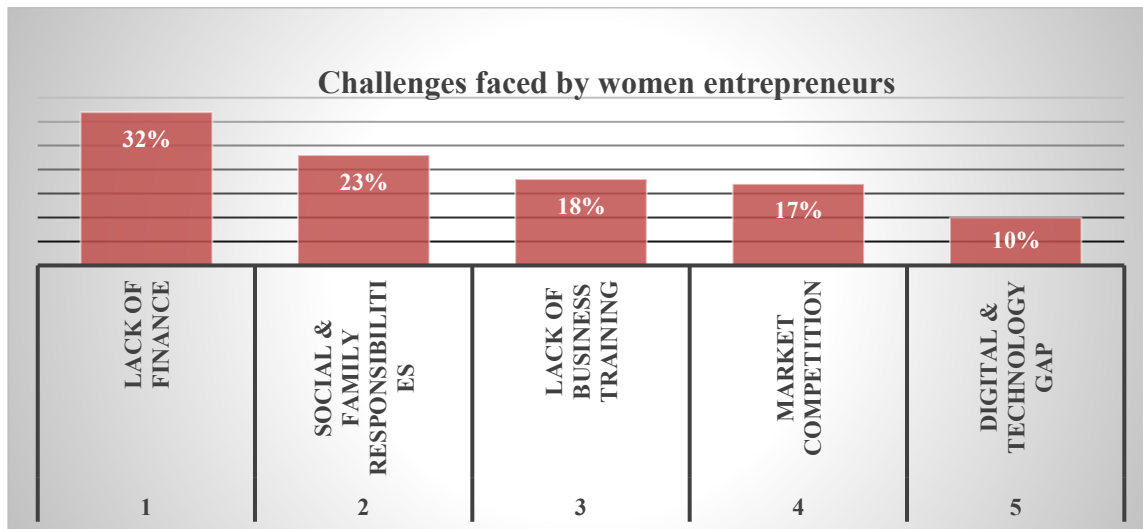
Women entrepreneurship in Maharashtra will only get bigger if women have the skills and training they need to succeed at running a business. There are also some issues that women in Maharashtra face when they start their own businesses, such as competing with other companies figuring out how much to charge for things creating a brand and coming up with marketing plans. The women entrepreneurship, in Maharashtra is also looking at the problems women are having with technology in 2024 especially when it comes to selling things and using digital platforms to run their businesses. So the thing is it also looks at the problems that women who start their own businesses in rural areas face. These women entrepreneurs have a time because they do not have good roads and other basic things they need to run a business. They also have a time selling their products because they are not close, to big markets.

Challenges faced by women entrepreneurs

Sr. No	Challenges	Percentage
1	Lack of Finance	32%
2	Social & Family Responsibilities	23%
3	Lack of Business Training	18%
4	Market Competition	17%
5	Digital & Technology Gap	10%

(Resource- NITI Aayog Report 2024, RBI Financial Inclusion Report 2024.)

The table shows that not having money is the biggest problem, for women entrepreneurs it is thirty two percent. Women entrepreneurs also have to deal with issues like taking care of social responsibilities which is twenty three percent and not getting enough training, which is eighteen percent. This year in 2024 women entrepreneurs are facing a problem, which is not having the right digital skills. So women entrepreneurs are still having trouble because of money problems and not having the technology these are the financial and technological barriers that women entrepreneurs have to face.



In this graph the main challenge faced is **lack of finance (32%)**, making it the biggest obstacle to starting and growing businesses. This is followed by social and family responsibilities (23%), which limit time and focus. Lack of business training (18%) also affects decision-making and management skills. Additionally, market competition (17%) makes survival difficult, while the digital and technology gap (10%) limits access to modern tools and wider markets.

Findings-

1. Women who start their businesses in Maharashtra are doing really well and this trend is going to continue until 2024. Women entrepreneurship, in Maharashtra is getting better and better every year until 2024.
2. Money problems are still the issue for women who start their own businesses and this is because financial constraints remain the biggest challenge, for women entrepreneurs.
3. There are gaps, in peoples digital skills and this is becoming a bigger and bigger problem. Digital skill gaps are really causing trouble. It is getting worse. We have to think about skill gaps and how they affect us. Digital skill gaps are an issue.
4. The Government has some good schemes, like Stand Up India and Pradhan Mantri Mudra Yojana that provide important support to people. These Government schemes, such, as Stand Up India and Pradhan Mantri Mudra Yojana are very helpful.
5. Urban areas have a higher number of women-owned businesses.

Conclusion-

Women who start their businesses in Maharashtra are doing really well these days. The government has started some schemes and women are using computers and the internet to help them with their businesses. They are also able to get money from banks easily But some women still face problems because they do not have money they have to take care of their families and they do not know how to use computers and the internet very well. If the government helps them more teaches them how to use computers and the internet and gives them money to start their businesses, women who start their businesses can help Maharashtra and India become better places. Women entrepreneurship can help make this happen and achieve the goal of Viksit Maharashtra and Viksit Bharat 2047. Women entrepreneurship is very important, for this

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Human Resource Development as a Strategic Pillar for Achieving the Vision of Viksit Bharat

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Abstract

*The vision of Viksit Bharat represents India's aspiration to become a fully developed nation characterized by economic prosperity, technological advancement, social inclusion, and sustainable growth. Human Resource Development (HRD) plays a central role in realizing this vision by enhancing human capital through education, training, skill development, and leadership initiatives. This research paper examines the strategic importance of HRD in national transformation. The study explores theoretical foundations, policy initiatives, challenges, and practical strategies associated with HRD in India. Using secondary data and qualitative analysis, the research highlights that effective HRD systems contribute significantly to productivity, innovation, employability, and inclusive development. The paper concludes that strengthening HRD frameworks through policy integration, digital transformation, and public-private partnerships is essential for achieving the goals of *Viksit Bharat*.*

Keywords: Human Resource Development, Viksit Bharat, Skill Development, Human Capital, Inclusive Growth, National Development

1) Introduction

India stands at a critical stage of transformation, aiming to emerge as a developed nation under the vision of Viksit Bharat. With one of the largest and youngest populations in the world, the country possesses a strong demographic advantage. However, demographic potential alone does not guarantee development. The quality of human capital determines whether a nation progresses toward prosperity or remains trapped in underdevelopment.

Human Resource Development (HRD) refers to planned and systematic activities designed to enhance knowledge, skills, competencies, and overall effectiveness of individuals and organizations (Swanson & Holton, 2009). HRD is not limited to corporate training; it encompasses education systems, vocational development, leadership cultivation, and institutional capacity building. In the context of Viksit Bharat, HRD acts as the backbone of economic growth and social progress. Rapid technological change, globalization, automation, and digitalization have transformed the nature of work. Therefore, continuous learning and skill enhancement have become essential.

Government initiatives such as Skill India, Digital India, Startup India, and the National Education Policy (2020) highlight the importance of structured HRD policies. These initiatives aim to bridge skill gaps, enhance employability, and promote entrepreneurship. However, challenges such as regional disparities, quality concerns, and implementation gaps remain. This research examines how HRD contributes to India's development journey and what strategies are required to strengthen it further.

2) Review of Literature

The concept of HRD has evolved significantly over time. Becker (1993) introduced the theory of human capital, emphasizing that investments in education and training yield long-term economic benefits.

Swanson and Holton (2009) defined HRD as a process of developing human expertise to improve organizational and societal performance.

Noe (2017) expanded HRD beyond training to include career development, organizational development, and performance management. Armstrong (2020) argued that HRD is a strategic function that enhances competitiveness and innovation.

From a macroeconomic perspective, Todaro and Smith (2015) highlighted that human capital formation is a key determinant of economic development in emerging economies. The World Bank (2019) emphasized reskilling and adaptability in the digital era.

In India, research shows a strong link between skill development and employability (Ghosh, 2021). Kumar and Reddy (2022) found that collaboration between industry and educational institutions reduces skill mismatch. Studies also suggest that inclusive HRD policies improve social mobility and reduce poverty.

Despite progress, literature identifies persistent issues such as unequal access to quality education, rural-urban disparities, and inadequate monitoring systems. Thus, while HRD is widely recognized as essential for development, its implementation requires continuous improvement.

3) Objectives

1. To examine the role of Human Resource Development in achieving the vision of *Viksit Bharat*.
2. To analyze the impact of HRD initiatives on economic growth and employability in India.
3. To evaluate the contribution of HRD toward inclusive growth, innovation, and sustainable national development.

4) Hypotheses

- H1: Human Resource Development initiatives have a significant positive impact on economic growth in India.
- H2: Skill development and training programs significantly improve employability and workforce productivity.
- H3: Effective HRD practices contribute positively to inclusive growth and sustainable development in India.

5) Role of HRD in Viksit Bharat

Human Resource Development (HRD) plays a transformative and strategic role in shaping India's journey toward becoming a developed nation under the vision of *Viksit Bharat*. A nation's real strength lies not only in its natural resources or capital investments but primarily in the quality of its human resources. HRD ensures that individuals possess the knowledge, skills, competencies, values, and adaptability required to contribute effectively to economic and social development. In the context of India's rapidly evolving economy, HRD serves as a critical driver of productivity, innovation, inclusiveness, and governance efficiency.

- 1. Enhancing Human Capital:** Human capital refers to the collective skills, knowledge, experience, and abilities possessed by individuals that contribute to economic productivity. HRD significantly enhances human capital by investing in education, vocational training, professional development, and continuous learning systems. In a country like India, where a large portion of the population is young, structured HRD initiatives can convert demographic advantage into economic strength. Quality education systems, skill development programs, and competency-based training increase workforce productivity. When individuals are equipped with relevant technical and soft skills, they become more efficient and innovative. HRD also promotes research orientation, critical thinking, and problem-solving capabilities, which are essential for knowledge-driven economies. Furthermore, investment in human capital leads to long-term economic returns. Skilled employees contribute to higher industrial output, improved service delivery, and technological advancement. Therefore, strengthening human capital through HRD is the foundation of sustainable national development.

2. **Supporting Economic Growth:** Economic growth is directly linked to the productivity and efficiency of a nation's workforce. HRD contributes to economic growth by improving labor quality, enhancing organizational performance, and fostering competitiveness in global markets. A skilled workforce attracts foreign investment and strengthens domestic industries. Through structured training and development initiatives, HRD increases employees' technical competence and managerial capabilities. This leads to improved production processes, better quality control, and enhanced customer satisfaction. As industries become more efficient, overall GDP growth improves. Moreover, HRD supports sectoral development in manufacturing, services, agriculture, and emerging industries. By aligning skill development programs with industry needs, HRD reduces unemployment and underemployment. A productive workforce not only increases income levels but also strengthens the purchasing power of citizens, thereby stimulating economic activity. In the vision of Viksit Bharat, sustained economic growth can only be achieved when human resources are continuously upgraded and aligned with national development goals.
3. **Promoting Digital Transformation:** The modern economy is driven by digital technologies such as Artificial Intelligence (AI), data analytics, robotics, blockchain, and automation. HRD plays a crucial role in preparing citizens and employees for this digital transformation. Without adequate digital literacy and technical training, the workforce may struggle to adapt to technological change. HRD initiatives promote digital education, coding skills, IT training, and technological awareness. Programs under Digital India and various skill development missions aim to make citizens digitally empowered. By enhancing digital competencies, HRD ensures that individuals remain relevant in the evolving job market. Digital transformation also improves governance, financial inclusion, healthcare delivery, and education systems. HRD equips public servants and private employees with digital tools that increase efficiency and transparency. Thus, HRD not only supports economic modernization but also enhances the overall digital ecosystem of the country.
4. **Encouraging Entrepreneurship:** Entrepreneurship is a key engine of economic growth and innovation. HRD fosters entrepreneurial development by building leadership skills, business knowledge, financial literacy, and risk-taking capacity among individuals. Training programs, mentorship initiatives, incubation centers, and startup support systems strengthen entrepreneurial ecosystems. Through entrepreneurship development programs (EDPs), HRD encourages self-employment and job creation. In a developing economy like India, startups contribute significantly to innovation, employment generation, and regional development. HRD initiatives provide aspiring entrepreneurs with managerial competencies, strategic planning skills, and market awareness. Government programs such as Startup India and Atal Innovation Mission complement HRD efforts by offering financial and infrastructural support. By nurturing innovation and creativity, HRD transforms job seekers into job creators, which is essential for achieving the goals of Viksit Bharat.
5. **Ensuring Inclusive Development:** Inclusive development ensures that economic progress benefits all sections of society. HRD plays a vital role in promoting social equity by providing equal access to education, training, and employment opportunities. Special HRD programs targeting women, rural youth, differently-abled individuals, and marginalized communities reduce socio-economic disparities. Skill development initiatives in rural areas enhance employability and reduce migration pressures. Women empowerment programs improve participation in the workforce and contribute to household income stability. Inclusive HRD fosters social mobility and reduces poverty. By ensuring that development opportunities are widely accessible, HRD strengthens social harmony and national unity. A truly *Viksit Bharat* must be inclusive, where growth is not limited to urban centers but reaches every segment of society.
6. **Strengthening Governance:** Effective governance is a fundamental requirement for national development. HRD enhances governance by improving the competencies, ethics, and efficiency of public administrators and policymakers. Training civil servants in leadership, digital systems, policy implementation, and citizen-centric approaches improves public service delivery. Capacity-building

programs strengthen institutional performance and accountability. When government officials are trained in modern management practices and technological tools, policy execution becomes more effective and transparent. This builds public trust and ensures better utilization of resources. Moreover, HRD promotes ethical leadership and integrity within public institutions. Strong governance frameworks supported by competent human resources are essential for sustainable development and global competitiveness.

6) Challenges in Human Resource Development

Human Resource Development (HRD) plays a critical role in achieving the vision of Vikasit Bharat, yet several structural and systemic challenges hinder its full effectiveness. Addressing these challenges is essential to transform India's demographic potential into sustainable national growth.

- 1. Skill Mismatch Between Education and Industry Needs:** One of the most significant challenges in HRD is the mismatch between the skills imparted by educational institutions and the competencies demanded by industries. Many graduates possess theoretical knowledge but lack practical exposure and technical expertise required in modern workplaces. Rapid technological advancements further widen this gap, as curricula often fail to keep pace with industry changes. As a result, employers struggle to find job-ready candidates, while educated youth face unemployment or underemployment. This mismatch reduces productivity and weakens national competitiveness.
- 2. Unequal Access to Quality Education in Rural Areas:** India faces substantial rural-urban disparities in access to quality education and training facilities. Urban regions generally have better infrastructure, skilled faculty, and digital resources, whereas rural areas often lack adequate training centers, internet connectivity, and professional guidance. This inequality limits opportunities for rural youth and restricts their participation in high-growth sectors. Without inclusive access to quality education and skill development, the objective of equitable growth under *Vikasit Bharat* cannot be fully realized.
- 3. Limited Industry-Academia Collaboration:** Effective HRD requires strong collaboration between educational institutions and industries. However, in many cases, this partnership remains weak or underdeveloped. Academic curricula are sometimes outdated and not aligned with real-world requirements. Limited internship opportunities, inadequate apprenticeship models, and insufficient industry exposure hinder practical learning. Strengthening this collaboration is necessary to ensure that students acquire relevant, industry-oriented skills.
- 4. Inadequate Infrastructure and Funding:** The successful implementation of HRD initiatives depends heavily on infrastructure and financial resources. Many training institutes lack modern laboratories, technological tools, and qualified trainers. Limited funding restricts the expansion of vocational programs and digital learning initiatives. Inadequate infrastructure particularly affects remote and economically weaker regions, slowing down the pace of human capital development.
- 5. Resistance to Continuous Learning:** In a rapidly evolving global economy, continuous learning and upskilling are essential. However, resistance to change and limited motivation for lifelong learning remain challenges in certain sectors. Some organizations and employees are reluctant to adopt new technologies or update their skills. This mindset restricts innovation and adaptability, reducing the overall effectiveness of HRD initiatives.
- 6. Regional Disparities in Policy Implementation:** Although national HRD policies are well-designed, their implementation varies significantly across states and regions. Differences in administrative capacity, governance efficiency, and local priorities create uneven outcomes. Some states demonstrate strong progress in skill development and education reforms, while others lag behind. These disparities hinder balanced national development and slow the achievement of *Vikasit Bharat* goals.

7) Strategies for Strengthening HRD in Vikasit Bharat

To overcome the above challenges, strategic and coordinated efforts are required. Strengthening HRD systems is essential to transform India into a developed and globally competitive nation.

- 1. Promoting Lifelong Learning Systems:** In the knowledge economy, learning cannot be limited to formal education. Lifelong learning systems should be encouraged through online courses, certification programs, and professional development initiatives. Government and private organizations must promote continuous upskilling and reskilling to ensure workforce adaptability. Flexible learning models, including hybrid and distance education, can increase accessibility.
- 2. Expanding Vocational Education and Apprenticeship Programs:** Vocational education should be integrated into mainstream academic systems to reduce skill gaps. Expanding apprenticeship programs provides practical exposure and hands-on experience to students. Industry-led skill development centers can ensure that training aligns with market needs. A dual education system combining classroom learning and workplace training can significantly enhance employability.
- 3. Strengthening Public-Private Partnerships (PPPs):** Public-private partnerships play a vital role in mobilizing resources, expertise, and infrastructure. Collaboration between government bodies, private companies, and educational institutions can create scalable and efficient HRD programs. Private sector involvement ensures industry relevance, while government support ensures inclusivity and policy alignment.
- 4. Integrating Digital Learning Platforms:** Digital transformation offers opportunities to bridge geographical and infrastructural gaps. Online learning platforms, virtual classrooms, AI-based training modules, and digital certification systems can make quality education accessible across the country. Investment in digital infrastructure, especially in rural areas, will democratize learning and reduce disparities.
- 5. Enhancing Research and Innovation Ecosystems:** HRD must encourage research culture and innovation ecosystems. Universities and research institutions should receive adequate funding and policy support to promote scientific inquiry and technological advancement. Innovation hubs, incubation centers, and research collaborations can generate new ideas and entrepreneurial ventures, strengthening India's global position.
- 6. Establishing Effective Monitoring and Evaluation Frameworks:** For HRD initiatives to succeed, robust monitoring and evaluation systems are essential. Data-driven assessment mechanisms can track performance, identify gaps, and ensure accountability. Regular evaluation helps in refining policies and improving implementation efficiency. Transparent governance enhances trust and maximizes the impact of HRD programs.
- 7. Encouraging Leadership and Ethical Development Programs:** Leadership development is a crucial component of HRD. Ethical, visionary, and competent leaders drive organizational and national progress. Training programs focused on leadership skills, decision-making, emotional intelligence, and ethical governance strengthen both public and private institutions. Developing responsible leaders ensures sustainable and value-driven development under Viksit Bharat.

8) Challenges in HRD

1. Skill mismatch between education and industry needs.
2. Unequal access to quality education in rural areas.
3. Limited industry-academia collaboration.
4. Inadequate infrastructure and funding.
5. Resistance to continuous learning in some sectors.
6. Regional disparities in implementation of policies.

9) Case Example

Case 1: Skill India Mission:

Launched in 2015, the Skill India Mission aims to train millions of youth in various sectors. The program focuses on industry-relevant training and certification. It has improved employability rates, particularly among rural youth. However, continuous quality monitoring is needed.

Case 2: IT Sector HRD Practices:

Indian IT companies invest heavily in employee reskilling and digital training. These initiatives enhance global competitiveness and innovation capacity, contributing significantly to India's GDP.

10) Discussion

The findings indicate that HRD is a cornerstone of India's transformation into a developed nation. Economic growth, innovation, social inclusion, and global competitiveness depend heavily on the quality of human capital. While government policies demonstrate commitment, effective coordination among stakeholders is crucial. Technology-driven HRD systems can bridge rural-urban gaps. Moreover, aligning education with industry needs is essential for maximizing returns on human capital investment. HRD must be viewed not as an expense but as a long-term investment in national prosperity.

11) Conclusion

Human Resource Development is fundamental to achieving the vision of *Viksit Bharat*. By enhancing skills, promoting innovation, and ensuring inclusive growth, HRD supports sustainable national development. Addressing implementation challenges and strengthening policy frameworks will accelerate India's journey toward becoming a developed nation. A well-designed HRD strategy can transform India's demographic advantage into a powerful engine of economic and social progress.

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E-Business and Global Business Transformation: The Role of Quick Commerce in Achieving Viksit Bharat 2047

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Abstract

The emergence of e-business has fundamentally transformed global trade by enabling faster, more efficient, and digitally integrated business processes. Quick commerce (Q-commerce), defined as ultra-fast delivery of goods within minutes, represents the next evolution of e-commerce and digital retail. India's rapid digitalization, supported by increasing internet penetration, smartphone adoption, and digital payment systems, has accelerated the growth of quick commerce. The sector has demonstrated significant economic contributions through employment generation, supply chain innovation, and increased consumer convenience. This study examines the role of quick commerce in transforming global business practices and contributing to India's vision of becoming a developed economy (Viksit Bharat) by 2047. The paper analyses growth trends, economic contributions, challenges, and policy recommendations. The findings suggest that quick commerce will play a crucial role in strengthening India's digital economy, enhancing logistics infrastructure, and promoting entrepreneurship, thereby supporting inclusive economic growth and global competitiveness.

Keywords: E-Business, Quick Commerce, Digitalization, Entrepreneurship, Global

1. Introduction

E-business refers to the use of digital technologies and internet platforms to conduct business activities such as buying, selling, marketing, and customer service. The evolution of e-business has transformed traditional commerce by eliminating geographical barriers and enabling real-time transactions. With globalization and technological advancement, businesses have shifted from physical retail to online platforms, improving efficiency and customer experience.

Quick commerce represents the latest advancement in e-business, offering ultra-fast delivery services, typically within 10–30 minutes. It utilizes digital platforms, dark stores, artificial intelligence, and advanced logistics systems to meet consumer demands for speed and convenience. India's quick commerce sector has grown rapidly due to increasing urbanization, changing lifestyles, and rising digital adoption. The country had approximately 969 million internet subscribers in 2025, creating a large consumer base for e-commerce and digital services.

Quick commerce is transforming global business models by improving supply chain efficiency, creating employment, and enhancing customer experience. As India moves toward its vision of Viksit Bharat 2047, digital commerce and quick commerce will play a critical role in strengthening the economy and improving living standards.

2. Review of Literature

Several researchers and reports have examined the growth and impact of quick commerce and e-business globally and in India.

IBEF (2025) reported that India's quick commerce market reached ₹64,000 crore in FY2025 and is expected to reach ₹2,00,000 crore by FY2028, reflecting rapid expansion driven by digital payments and consumer demand.

Bain & Company (2025) found that quick commerce accounts for more than two-thirds of total e-grocery orders in India, highlighting its increasing dominance in digital retail.

Business Standard (2025) emphasized the importance of dark stores and logistics infrastructure in enabling fast deliveries and supporting rapid growth in the quick commerce sector.

Economic studies have shown that quick commerce improves supply chain efficiency and provides employment opportunities, with over 400,000 workers engaged in the sector.

Academic research has also highlighted the importance of efficient logistics, demand forecasting, and pricing models in improving quick commerce sustainability and profitability.

These studies collectively demonstrate that quick commerce has emerged as a major driver of digital economic growth and global business transformation.

3. Objectives of the Study

The study aims to achieve the following objectives:

1. To examine the role of e-business in global business transformation.
2. To analyse the growth and development of quick commerce in India.
3. To evaluate the contribution of quick commerce to economic development.
4. To identify challenges faced by the quick commerce sector.
5. To suggest policy recommendations for sustainable growth.
6. To assess the role of quick commerce in achieving Viksit Bharat 2047.

4. Research Methodology

This study adopts a descriptive and analytical research design to examine the role of e-business and quick commerce in global business transformation and its contribution to India's vision of Viksit Bharat 2047. The descriptive approach helps in explaining the concept, structure, and growth of quick commerce, while the analytical approach evaluates its economic contribution, challenges, and future potential. This design helps in understanding the relationship between digital commerce and economic development.

The study is based on secondary data, as it focuses on analysing existing trends and industry developments. The data has been collected from reliable sources such as government reports, Reserve Bank of India publications, India Brand Equity Foundation reports, academic journals, research papers, industry reports, and reputed newspapers and official websites. These sources provide relevant and updated information on the growth, scope, and economic impact of quick commerce.

The scope of the study is limited to India, with emphasis on the growth and expansion of quick commerce, its contribution to the digital economy, and its role in business transformation. The collected data has been analysed using descriptive and interpretative methods, including trend analysis and comparative analysis, to understand patterns and draw meaningful conclusions.

This study follows a qualitative research approach, focusing on conceptual and analytical understanding rather than statistical analysis. However, the study has certain limitations, as it is based on secondary data and the quick commerce sector is rapidly evolving. Despite these limitations, the methodology provides useful insights into the role of quick commerce in supporting economic growth and achieving the vision of Viksit Bharat 2047.

5. Growth of E-Commerce in India in Relation to Quick Commerce

India has witnessed remarkable growth in e-commerce over the last decade, driven by increasing internet penetration, widespread smartphone usage, affordable data plans, and growing digital literacy. This growth has created a strong foundation for the emergence and expansion of Quick Commerce (Q-Commerce), which focuses on ultra-fast delivery of essential goods.

1. Expansion of Internet and Smartphone Usage

The rapid increase in internet users in India has played a crucial role in e-commerce growth. With millions of people gaining access to smartphones and affordable mobile data, consumers can easily browse products, compare prices, and place orders online. This digital transformation has made online shopping

convenient and accessible, especially in urban and semi-urban areas. Quick commerce platforms use mobile applications to enable customers to place orders instantly and receive fast delivery.

2. Growth of Digital Payment Systems

The development of secure and fast digital payment systems such as UPI, mobile wallets, and online banking has increased consumer confidence in online transactions. Digital payments allow quick and seamless order processing, which is essential for the success of quick commerce. The availability of instant payment options has reduced dependency on cash and improved operational efficiency.

3. Changing Consumer Preferences

Modern consumers prefer convenience, speed, and flexibility. Busy lifestyles, working professionals, and nuclear families have increased the demand for fast delivery of groceries and daily essentials. Traditional e-commerce usually takes one or two days for delivery, but quick commerce fulfils urgent needs within minutes. This shift in consumer expectations has accelerated the growth of quick commerce services.

4. Urbanization and Lifestyle Changes

Rapid urbanization has increased demand for convenient shopping solutions. People living in cities often face time constraints and prefer doorstep delivery. Quick commerce platforms use dark stores located near residential areas to ensure fast delivery. This model has made online shopping more efficient and customer-friendly.

5. Role of Quick Commerce Companies

Several companies have contributed significantly to the growth of quick commerce in India. Platforms such as Blinkit, Zepto, and Swiggy (through Instamart) provide delivery within 10–30 minutes. These companies use advanced technology, real-time inventory systems, and efficient logistics networks to meet customer demand.

6. Impact of COVID-19 Pandemic

The COVID-19 pandemic significantly accelerated the growth of e-commerce and quick commerce in India. Consumers preferred contactless delivery and online shopping for safety reasons. This led to increased adoption of digital platforms and strengthened the quick commerce business model.

7. Employment Generation and Economic Contribution

The growth of e-commerce and quick commerce has created employment opportunities in delivery services, warehousing, logistics, and technology. It has also supported small retailers and local suppliers by connecting them with digital platforms.

8. Future Growth Potential

India's e-commerce sector is expected to continue growing rapidly due to technological advancements, improved infrastructure, and increasing consumer demand for instant delivery. Quick commerce is likely to play a key role in shaping the future of retail by providing faster, more efficient, and customer-centric services.

6. Expansion and Scope

Quick commerce has expanded rapidly across urban and semi-urban areas, offering a wide range of products such as groceries, electronics, and personal care items.

The sector has experienced significant growth due to:

1. Increasing urbanization
2. Changing consumer lifestyles
3. Rising disposable income
4. Improved digital infrastructure

Quick commerce accounts for approximately 20% of India's e-commerce sector and continues to expand rapidly.

The expansion of dark stores and logistics networks has enabled companies to deliver products quickly and efficiently, improving customer satisfaction and business efficiency.

7. Contribution to Economy

Quick commerce contributes significantly to India's economic growth in several ways:

1. **Employment Generation:** The sector employs over 400,000 workers, including delivery personnel, warehouse workers, and technology professionals.
2. **Economic Growth:** Quick commerce contributes to GDP growth by increasing consumption and improving supply chain efficiency.
3. **Support for MSMEs:** Quick commerce platforms provide opportunities for small businesses and startups to reach wider markets.
4. **Digital Economy Development:** The sector promotes digital payments and financial inclusion, strengthening the digital economy.
5. **Logistics and Infrastructure Development:** The growth of quick commerce has led to improvements in logistics, warehousing, and transportation infrastructure.

8. Challenges Faced

Despite its rapid growth, quick commerce faces several challenges:

1. **Profitability Issues:** High logistics costs and infrastructure investments reduce profitability.
2. **Workforce Challenges:** Many delivery workers face job insecurity and lack social protection.
3. **Infrastructure Limitations:** Limited infrastructure in rural areas restricts expansion.
4. **Competition:** Intense competition among platforms affects sustainability.
5. **Regulatory Issues:** Data protection, taxation, and labour regulations require proper management.

9. Policy Recommendations

To ensure sustainable growth, the government should implement the following measures:

1. Strengthening digital infrastructure
2. Improving logistics and transportation networks
3. Providing social security for gig workers
4. Encouraging innovation and entrepreneurship
5. Supporting MSMEs through digital platforms
6. Developing clear regulatory frameworks

These measures will promote sustainable growth and economic development.

10. Future Outlook Towards Viksit Bharat 2047

Quick commerce will play a crucial role in achieving India's vision of becoming a developed nation by 2047.

Future developments may include:

1. Use of artificial intelligence and automation
2. Expansion into rural areas
3. Integration with global supply chains
4. Growth of digital entrepreneurship
5. Improved logistics efficiency

The sector is expected to grow significantly and contribute to economic development, employment generation, and global competitiveness.

11. Conclusion

Quick commerce represents a significant advancement in e-business and global business transformation. It has improved supply chain efficiency, created employment opportunities, and enhanced customer convenience. India's strong digital infrastructure, growing internet penetration, and supportive government policies have accelerated the growth of quick commerce.

Despite challenges such as profitability and infrastructure limitations, the sector has immense potential to contribute to India's economic growth. With proper policy support and technological advancement, quick commerce will play a key role in achieving the vision of Viksit Bharat 2047 and strengthening India's position as a global economic leader.

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Impact of Jal Jeevan Mission on society: A comparative study of Wai, Khandala, Mahabaleshwartehtsils in Satara District

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Abstract

The present study titled “Impact of Jal Jeevan Mission on Society: A Comparative Study of Wai, Khandala, and Mahabaleshwar Tehsils in Satara District” examines the socio-economic and developmental outcomes of the Jal Jeevan Mission implemented by the Ministry of Jal Shakti, Government of India. The research focuses on rural households in the tehsils of Wai, Khandala, and Mahabaleshwar within Satara district, aiming to assess the programme’s effectiveness in providing Functional Household Tap Connections (FHTC) and improving quality of life.

The study is based on both primary data collected through household surveys and interviews, and secondary data obtained from government reports and official records. A comparative analytical approach is used to evaluate variations in water accessibility, health and sanitation conditions, time savings, women’s participation, and overall social well-being across the selected regions. Findings indicate that the mission has significantly improved access to safe drinking water, reduced the burden of water collection, and enhanced hygiene practices. However, differences in geographical terrain, infrastructure availability, and local governance capacity have influenced the level of programme success among the three tehsils.

The study concludes that while the Jal Jeevan Mission has positively transformed rural society, sustained maintenance, community participation, and effective local administration are essential for long-term sustainability and equitable outcomes. In this study we used the mixed (Hybrid) Methods for my research which were used qualitative and quantitative methods. In this research used Exploratory research design for this research. For this research we select some of the major 3 Blocks in Satara district such as Wai, Khandala and Mahabaleshwar.

Introduction

This study examines the impact of the Jal Jeevan Mission (JJM) on rural society in Satara district, focusing on Wai, Khandala, and Mahabaleshwar talukas. Using both primary surveys and secondary data from government reports on aim to provide Functional Household Tap Connection (FHTC) Comparative analysis reveals that terrain and governance significantly influence outcomes. Jal Jeevan Mission (JJM) is a visionary initiative launched by the Ministry of Jal Shakti, Government of India, on 15th August 2019. Its primary objective is to provide every rural household in India with a regular supply of safe, potable, and adequate drinking water through tap connections. The mission is guided by the principle of “Har Ghar Jal” (Water to Every Household), aiming to transform rural water access and improve public health.

JJM emphasizes that water supply must not only be regular but also safe, clean, and healthy. Water quality is a critical component of the mission, and special attention is given to monitoring and surveillance. During the planning of each scheme, water sources are carefully selected to ensure they meet prescribed quality standards, safeguarding the health of rural communities. To empower local communities, Field Test Kits (FTKs) are provided at the village level, enabling Gram Panchayats, VWSC members, and women to conduct water quality tests independently after training. At the state and district levels, Water Testing Laboratories perform detailed chemical and bacteriological analyses. Additionally, IEC (Information, Education, and Communication) activities raise awareness about the safe use of drinking water, reinforcing

the mission's goal of "Har Ghar Jal – Surakshit Jal" (Water to Every Household – Safe Water). JJM recognizes that the sustainability of rural water supply schemes depends on effective operation and maintenance. Simply completing and handing over schemes is not sufficient. The mission prioritizes Skilling and Training to develop local manpower, ensuring that systems are maintained efficiently and reliably over time.

Through skilling initiatives, trained personnel known as "Nal Jal Mitras" are certified to manage and maintain water supply systems locally. Their availability ensures timely repairs, reduces maintenance costs, and minimizes dependence on external agencies. This approach promotes community ownership, enhances long-term sustainability, and strengthens rural water governance.

Benefits /Significance Of The Jal Jeevan Mission

1. Improved Access to Safe Drinking Water
 - Ensures Functional Household Tap Connections (FHTC) for rural families.
 - Reduces dependence on wells, rivers, and tanker water.
2. Better Public Health
 - Decreases water-borne diseases such as diarrhea and cholera.
 - Promotes hygienic living conditions.
3. Women Empowerment
 - Reduces time and physical effort spent collecting water.
 - Allows women to engage in education, employment, and social activities.
4. Improved Sanitation and Hygiene
 - Supports cleanliness and better sanitation practices at the household level.
 - Strengthens outcomes of Swachh Bharat initiatives.
5. Time and Productivity Savings
 - Saves daily time for households, improving productivity and quality of life.
6. Social and Economic Development
 - Enhances living standards in rural areas.
 - Improves school attendance and community well-being.
7. Community Participation and Local Governance
 - Encourages Gram Panchayat involvement in water management.
 - Promotes sustainable and locally managed water systems.

Limitations Of The Study:

The present study is limited to selected tehsils namely Wai, Khandala, and Mahabaleshwar of Satara district; therefore, the findings may not represent the overall situation of other regions. The study mainly relies on secondary data and responses collected from households, which may include subjective opinions and reporting limitations. Due to time constraints, the research focuses on the current status of the Jal Jeevan Mission and does not examine long-term sustainability outcomes. Geographical variations among the selected tehsils, especially hilly and rural areas, may influence comparative results. Additionally, the study depends on available government records and published data, which may affect the completeness and accuracy of analysis.

Scope Of The Study:-

The study focuses on examining the impact of the Jal Jeevan Mission on rural households in the selected tehsils of Wai, Khandala, and Mahabaleshwar in Satara district. It covers the implementation status, availability of Functional Household Tap Connections (FHTC), access to safe drinking water, and comparative effectiveness of the scheme across the three regions. The study also evaluates the social impact of the mission in terms of health, sanitation, and improvement in the quality of life of rural communities.

Statement Of Research Problem

Access to safe and sufficient drinking water continues to be a significant concern in rural India, as it directly influences public health, sanitation standards, gender equality, and overall socio-economic progress.

In response to these challenges, the Government of India introduced the Jal Jeevan Mission with the goal of ensuring Functional Household Tap Connections (FHTC) for all rural households and promoting sustainable water supply management. However, despite the implementation of this initiative, inequalities in water availability and service delivery persist across different regions due to variations in geographical features, infrastructural development, administrative effectiveness, and levels of community participation. For instance, hilly and semi-urban areas such as Mahabaleshwar encounter distinct water management challenges compared to relatively plain regions like Wai and Khandala in Satara district. Such regional differences may affect the overall effectiveness and social outcomes of the programme. Although the Jal Jeevan Mission seeks to enhance living standards through improved access to safe drinking water, there is limited comparative empirical research examining its societal impact across different tehsils within the same district. Key aspects such as sustainability of water supply systems, service quality, public awareness, reduction in women's workload, and improvements in health conditions require systematic assessment. Therefore, this study aims to evaluate and compare the societal impact of the Jal Jeevan Mission in Wai, Khandala, and Mahabaleshwar tehsils of Satara district. The research intends to measure programme effectiveness, analyses regional variations, and assess socio-economic transformations resulting from improved water accessibility, thereby contributing to filling the existing research gap.

Objectives of The Study

1. To examine the implementation and coverage of the Jal Jeevan Mission in rural areas of Satara district.
2. To assess the availability of Functional Household Tap Connections (FHTC) and access to safe drinking water in the selected tehsils of Wai, Khandala, and Mahabaleshwar.
3. To compare the effectiveness of the mission across the three selected tehsils based on geographical and administrative differences.
4. To identify the challenges faced in the implementation and sustainability of rural water supply systems.
5. To analyses the social impact of the Jal Jeevan Mission on rural households with reference to health, sanitation, and quality of life.

Hypotheses Of The Study

- H₁: There is a significant difference in the implementation and coverage of the Jal Jeevan Mission across rural areas of Satara district.
- H₂: There is a significant difference in the availability of Functional Household Tap
- H₃: Geographical and administrative differences significantly influence the effectiveness of the Jal Jeevan Mission across the selected tehsils.
- H₄: Significant challenges exist in the implementation and sustainability of rural water supply systems under the Jal Jeevan Mission.
- H₅: The Jal Jeevan Mission has a significant social impact on rural households in terms of health, sanitation, and quality of life.

Review Of Literature:

1. **Government of India (2019) Jal Jeevan Mission: Operational guidelines. Ministry of Jal Shakti, New Delhi.** The Government of India introduced the Jal Jeevan Mission to ensure Functional Household Tap Connections (FHTC) for all rural households. The guidelines emphasize sustainable water supply systems, community participation, and decentralized water management through local governance institutions. The programme aims to improve health, sanitation, and quality of life in rural areas.
2. **NITI Aayog (2021) Composite Water Management Index Report. Government of India.** A report published by NITI Aayog highlights the importance of efficient water resource management and improved rural water supply systems. The study found that access to safe drinking water contributes

to better public health outcomes, reduces medical expenses, and enhances socio-economic productivity in rural communities.

3. World Health Organization (2017) *Guidelines for drinking-water quality* (4th ed.). Geneva: WHO Press. According to the World Health Organization, safe and reliable drinking water is essential for preventing water-borne diseases and improving hygiene and sanitation practices. The report stresses that household-level water access significantly reduces health risks, particularly in developing countries.

4. Kumar, M., & Singh, R. (2020) Rural drinking water supply and public health outcomes in India. *International Journal of Rural Development*, 12(2), 45–58.

The authors examined rural drinking water programmes in India and concluded that improved water accessibility leads to reductions in disease prevalence and enhances living conditions. The study also emphasized the role of infrastructure maintenance and community awareness in ensuring programme sustainability.

5. Deshmukh, S., & Pawar, P. (2019) Rural development programmes and local governance in Maharashtra. *Journal of Social and Economic Development*, 21(1), 78–92.

This study analysed rural development initiatives in Maharashtra and found that geographical and administrative factors significantly influence programme outcomes. The research highlighted challenges faced in hilly regions compared to plain areas, suggesting the need for location-specific implementation strategies.

6. UNICEF (2020) *Water, sanitation and hygiene (WASH) programme report*. United Nations Children's Fund. The UNICEF report emphasizes that improved water supply systems contribute to better sanitation practices, reduced gender inequality, and increased school attendance, especially among girls. The study supports the importance of household tap connections in rural development.

Research Gap

Existing literature on rural water supply programmes mainly focuses on national and state-level outcomes of the Jal Jeevan Mission, highlighting achievements in coverage and implementation strategies. However, limited research has examined regional differences within districts, particularly through comparative studies at the tehsil level. There is a lack of empirical evidence analysing how geographical conditions, administrative factors, and community participation influence programme effectiveness, especially between hilly and plain areas. Moreover, fewer studies have evaluated broader social impacts such as improvements in health, sanitation, women's workload reduction, and quality of life, along with the long-term sustainability of water supply systems. No comprehensive comparative study has been conducted in Satara district covering Wai, Khandala, and Mahabaleshwar; therefore, the present study aims to fill this research gap by analysing the societal impact and comparative effectiveness of the programme across these regions.

Research Methodology And Design: -

Case study method used for This study and for these research we use the secondary data sources for data collection due to time limitations. This study adopts a mixed (hybrid) research methodology, integrating both qualitative and quantitative approaches to achieve a comprehensive analysis. An exploratory research design has been employed to gain deeper insights into the research problem. For the purpose of the study, three major blocks of Satara district—Wai, Khandala, and Mahabaleshwar—were selected as the study area. Researcher will be used Convenience sampling method for further study in the areas of this research.

Data Collection

The present study titled "*Impact of Jal Jeevan Mission on Society: A Comparative Study of Wai, Khandala, and Mahabaleshwar Tehsils in Satara District*" is based only on secondary sources of data due to time limitations but whenever we get quantitative data then it will be beneficial for collection of primary data through various sources. Secondary data were obtained from various authentic sources, including government reports, policy documents, official websites, census records, research journals, and published

literature related to rural water supply and development programmes. Reports issued by the Ministry of Jal Shakti, state water supply departments, and district administration were used to understand implementation progress and coverage under the Jal Jeevan Mission.

Data Analysis:

Table 1. Coverage Status Of Household Tap Connections

<u>Sanction Year</u>	<u>Total Schemes</u>	<u>Zilla Parishad (ZP)</u>	<u>Maharashtra Jeevan Prabhakaran (MJP)</u>
2019–2020	1,38,54,445	54,06,781	39.03
2020–2021	1,42,36,135	91,03,747	63.95
2021–2022	1,46,08,532	1,03,52,578	70.87
2022–2023	1,46,73,257	1,09,85,193	74.87
2023–2024	1,46,72,395	1,25,01,423	85.2
2024–2025	1,46,78,590	1,31,19,974	89.38
2025–2026	1,46,78,590	1,32,10,394	90

The data shows a continuous increase in coverage under the Jal Jeevan Mission from **2019 2020 to 2025–2026**. The percentage of implementation through Zilla Parishad (ZP) improved from **39.03% to 90%**, indicating significant progress in providing household tap connections and effective execution of the programme over the years.

<u>Sanction Year</u>	<u>Total Schemes</u>	<u>Zilla Parishad (ZP)</u>	<u>Maharashtra Jeevan Prabhakaran (MJP)</u>
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2022–2023	1,46,73,257	1,09,85,193	74.87
2023–2024	1,46,72,395	1,25,01,423	85.2
2024–2025	1,46,78,590	1,31,19,974	89.38
2025–2026	1,46,78,590	1,32,10,394	90

Har Ghar Jal Present Status Total Blocks: 351

Financial Year	No. of Panchayat	No. of Har Ghar Jal Panchayat (Reported)	No. of Har Ghar Jal Panchayat (Certified)	No. of Villages	No. of Har Ghar Jal Villages (Reported)	No. of Har Ghar Jal Villages (Certified)
01/04/2021	27,880	4,491	0	40,495	6,934	0
01/04/2022	27,863	4,979	0	40,327	8,149	0
01/04/2023	27,863	5,848	665	40,297	9,480	1,230
01/04/2024	27,844	10,522	6,322	40,297	16,766	10,777
01/04/2025	27,852	12,176	7,468	40,297	19,256	12,477
24/08/2025	27,852	12,445	8,061	40,297	19,634	13,376

The data shows steady progress in achieving **Har Ghar Jal** targets under the Jal Jeevan Mission from 2021 to August 2025. The number of reported and certified Har Ghar Jal Panchayats and villages increased significantly over time, indicating continuous expansion of household tap water coverage. Certified Panchayats rose from **0 in 2021** to **8,061 in 2025**, while certified villages increased from **0 to 13,376**, reflecting improved verification, implementation efficiency, and gradual achievement of universal rural water supply goals.

Findings And Conclusions

1. The Jal Jeevan Mission significantly improved access to household tap water in rural areas.
2. Implementation performance increased steadily due to active involvement of local governance institutions.
3. Regional differences were observed, with hilly areas facing more implementation challenges than plain regions.
4. The programme reduced women's workload and improved sanitation and health conditions.
5. Overall, the Jal Jeevan Mission has positively transformed rural living standards, though effectiveness varies based on geographical and administrative factors.

Suggestions

1. Strengthen maintenance systems and regular water quality monitoring for long-term sustainability.
2. Increase community participation and awareness programmes for efficient water management.
3. Provide special infrastructure support for difficult and hilly regions.
4. Enhance coordination between local authorities for better implementation outcomes.

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Study of “Viksit Bharat 2047” And Its Impact on Indian Industries

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Abstract –

The vision of Viksit Bharat 2047 represents India's long-term strategic roadmap to transform itself into a developed nation by the centenary of its independence. Announced and promoted under the leadership of Narendra Modi, this initiative integrates economic growth, industrial transformation, technological innovation, sustainability, and inclusive development. This research paper critically examines the impact of the Viksit Bharat framework on Indian industries, focusing on manufacturing, MSMEs, information technology, infrastructure, renewable energy, and export competitiveness. The study adopts a qualitative-analytical methodology based on secondary data from government reports, policy documents, and economic surveys. The findings suggest that policy instruments such as Make in India, Atmanirbhar Bharat Abhiyan, Digital India, and Production Linked Incentive (PLI) schemes have significantly accelerated industrial output, investment inflows, and export growth. However, structural challenges including skill deficits, infrastructure gaps, regulatory complexity, and global economic volatility continue to constrain optimal industrial expansion. The paper concludes that sustained policy coherence, technological modernization, and human capital development are critical for realizing the Viksit Bharat industrial vision.

Keywords: Viksit Bharat 2047, Industrial Growth, Manufacturing, MSMEs, PLI Scheme, Indian Economy, Sustainable Development

1. Introduction -

India's aspiration to become a developed economy by 2047 has been articulated through the Viksit Bharat 2047 vision. The framework emphasizes structural transformation, industrial modernization, technological leadership, and sustainable development. Industrial growth remains central to this transformation, contributing approximately 28–30% of India's Gross Domestic Product (GDP) and employing millions across manufacturing, services, and micro-enterprise sectors (Government of India, 2024). Historically, India transitioned from an agrarian-dominated economy to a service-led growth model after liberalization in 1991. However, the Viksit Bharat agenda seeks to rebalance this trajectory by strengthening manufacturing capacity, enhancing export competitiveness, and promoting self-reliance. The vision aligns with global value chain integration and aims to position India among the top three global economies by 2047.

This study examines how Viksit Bharat policies influence Indian industries structurally, financially, and technologically.

2. Literature Review - Industrial transformation in developing economies has been widely studied under modernization and structural change theories (Lewis, 1954; Kuznets, 1971). Recent scholarship emphasizes industrial policy as a tool for economic upgrading in emerging markets (Rodrick, 2008). In the Indian context, scholars have analysed the impact of industrial reforms post-1991 liberalization, particularly focusing on FDI inflows, export orientation, and sectorial diversification (Panagariya, 2008). Studies on manufacturing competitiveness highlight the importance of logistics efficiency, skill formation, and regulatory simplification (World Bank, 2023). Policy-driven initiatives such as Make in India and PLI schemes have been examined for their potential to boost domestic value addition and reduce import dependence (NITI Aayog, 2023). However, empirical literature assessing the broader Viksit Bharat framework remains limited, given its relatively recent articulation. This paper contributes by synthesizing policy impacts across industrial sectors within this long-term developmental paradigm

3. Research Objectives

1. To analyse the conceptual framework of Viksit Bharat 2047.
2. To examine sector-wise industrial impacts of key government initiatives.
3. To evaluate recent statistical trends in investment, production, and employment.
4. To identify structural challenges affecting industrial expansion.
5. To propose policy recommendations for sustainable industrial growth

4. Methodology - This research employs a qualitative and descriptive analytical approach. Secondary data sources include:

1. Economic Survey of India (2023–24)
2. RBI Annual Reports
3. Ministry of Commerce and Industry publications
4. NITI Aayog policy documents
5. Industry performance statistics

Data were analysed using comparative and trend-based evaluation to assess industrial outcomes.

5. Policy Framework Supporting Viksit Bharat

5.1 Make in India - Launched in 2014, Make in India aims to increase manufacturing's contribution to GDP to 25%. The initiative targets 25 sectors including automotive, pharmaceuticals, electronics, defense production, and textiles. FDI inflows into manufacturing have increased significantly over the last decade, indicating improved investor confidence.

5.2 Atmanirbhar Bharat Abhiyan - The Atmanirbhar Bharat initiative emphasizes domestic capacity building and reduced import dependence. It introduced credit support, structural reforms, and fiscal stimulus to industries, especially MSMEs.

5.3 Production Linked Incentive (PLI) Scheme - The PLI scheme, covering 14 sectors, has attracted investments exceeding ₹2 lakh crore and generated substantial incremental production. Key beneficiary sectors include mobile manufacturing, pharmaceuticals, and electronics.

5.4 Digital India- Digital India enhances digital infrastructure, enabling Industry 4.0 integration, fintech expansion, and digital payments penetration. India has become one of the global leaders in real-time digital transactions.

6. Sectorial Impact Analysis

6.1 Manufacturing Sector - Manufacturing has shown accelerated growth under PLI incentives. Electronics production has increased substantially, with India emerging as a major smartphone exporter. Domestic value addition has improved due to supply chain localization.

Table 1: Manufacturing Indicators (FY 2023–24)-

The upward trajectory indicates policy effectiveness but remains below the 25% GDP target.

Sr. No	Indicator	Value
1	PLI Investment	₹2+ lakh crore
2	Jobs Created	12+ lakh
3	Electronics Exports	\$40+ billion
4	Manufacturing Share in GDP	17–18%

6.2 MSMEs - India has over 63 million MSMEs contributing nearly 30% to GDP and around 45% to exports. Credit guarantee schemes and digital on boarding have enhanced formalization. However, access to affordable capital remains a persistent constraint.

6.3 Information Technology & Digital Services - India's IT sector continues to drive service exports exceeding \$150 billion annually. AI adoption, cyber security services, and semiconductor initiatives are aligned with Viksit Bharat's technological objectives

6.4 Infrastructure Development- Capital expenditure on infrastructure has increased significantly in recent budgets. Improved highways, freight corridors, and port modernization reduce logistics costs and enhance industrial competitiveness.

6.5 Renewable Energy and Green Industries - India aims for net-zero emissions by 2070. Renewable capacity expansion supports green industrialization. Investment in solar manufacturing and green hydrogen positions India as a potential global clean-energy hub

7. Opportunities Emerging from Viksit Bharat

1. Increased global supply chain diversification favouring India.
2. Rising FDI inflows in high-technology sectors.
3. Expansion of export-oriented manufacturing.
4. Rapid digital transformation enabling productivity gains.
5. Growth in sustainable and green industries.

8. Challenges- Despite - progress, several structural challenges persist:

- Skill gap in advanced manufacturing technologies.
- Regulatory complexity and compliance burden.
- Global trade uncertainties and geopolitical risks.
- Infrastructure disparities between urban and rural regions.
- Limited R&D expenditure relative to GDP.

Addressing these constraints is critical for achieving developed-nation status.

9. Discussion -

The Viksit Bharat framework represents a shift from incremental reform to long-term structural planning. Industrial policy instruments such as PLI demonstrate measurable outcomes in production and employment generation. However, sustainable industrialization requires deeper institutional reforms, investment in human capital, and innovation ecosystems.

Comparatively, East Asian economies achieved rapid industrialization through export-oriented manufacturing supported by strong state coordination. India's approach blends market liberalization with targeted incentives. The long-term success of Viksit Bharat will depend on policy continuity, private sector dynamism, and macroeconomic stability.

10. Conclusion -

The vision of Viksit Bharat 2047 has significantly influenced Indian industrial policy and performance. Initiatives such as Make in India, Atmanirbhar Bharat, Digital India, and PLI schemes have strengthened manufacturing output, attracted investment, and expanded exports. While the trajectory is positive, structural challenges remain. Sustained reforms in skill development, innovation, infrastructure, and regulatory simplification are essential to ensure that Indian industries become globally competitive and sustainable by 2047.

India stands at a transformative juncture. If policy execution remains consistent and inclusive, the Viksit Bharat vision can redefine India's industrial landscape and secure its position among the world's developed economies.

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Approach and Perspectives of Tourism in Maharashtra**Dr.Pratibha Chikmath.**

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Abstract-

Maharashtra is one of the India's most dynamic and diverse states, a treasure trove of tourism. Maharashtra attracts tourists from other Indian states and foreign countries. It was the second most visited Indian state by foreigners and fifth most visited state by domestic tourists in the country in 2021. Chhatrapati Sambhajanagar (Aurangabad) is the tourism capital of Maharashtra. This research paper explores the rich cultural heritage, historical landmarks, natural beauty, and urban attractions that make Maharashtra a significant player in India's tourism sector. Tourism industry in Maharashtra has a tremendous potential for growth, given the availability of basic infrastructure and the variety of tourist themes offered by various destinations in Maharashtra. Maharashtra has a rich historical and cultural heritage, which has been under-explored by the tourism industry and the government agencies. The strong basic infrastructure availability through out the state would provide a perfect platform for fresh private investments in development of tourism in the state, and in the process creating many direct and indirect employment opportunities to local residents.

Introduction :-

World tourism is considered as a significant factor in the economy of many nations. Today tourism related infrastructure in various parts of the country has improved the quality of life of the local people and helped to promote local arts and crafts. Tourism has contributed to increase awareness about conservation of the historical places, environment and cultural heritage. Tourism is the fastest growing industry in modern world. People have travelled to different parts of the world, India and states to see or visit monuments, forts, arts and culture test new cuisine etc. Tourism industry in Maharashtra has a tremendous potential for growth, given the availability of basic infrastructure and the variety of tourist themes offered by various destinations in Maharashtra. Maharashtra has a rich historical and cultural heritage, which has been under-explored by the tourism industry and the government agencies. The strong basic infrastructure availability through out the state would provide a perfect platform for fresh private investments in development of tourism in the state, and in the process creating many direct and indirect employment opportunities to local residents.

Objectives:

1. To understand the basic concepts of tourism perspective.
2. To understand the need to study Tourism management in view of the changing scenario.

Research Methodology:

This research paper, "Approach and Perspectives of Tourism in Maharashtra", focusing on historical, cultural, and natural attractions, infrastructure development, socio-economic impacts, and challenges. The research paper is mainly based on secondary data. This secondary data is collected from Indian Tourism Statistics, Tourism policy of Maharashtra. Municipal Corporation Policy, Tourism Journals, Reference Books, reports, documents of Government of Maharashtra. etc.

Historical and Cultural Tourism in Maharashtra.

Maharashtra is a diverse state with numerous historical and cultural landmarks that offer visitors a deep connection to India's rich past and vibrant traditions. The state is home to historical forts, rock-cut caves, ancient temples, and a wide array of festivals that showcase its cultural heritage. The Ajanta Caves, a UNESCO World Heritage Site, are famous for their exquisite Buddhist rock-cut temples and monasteries

dating back to the 2nd century BCE, adorned with elaborate frescoes and sculptures depicting the life of the Buddha and Buddhist teachings. The Ellora Caves, another UNESCO World Heritage Site, are known for their impressive rock-cut temples that span different religious traditions, including Hinduism, Buddhism, and Jainism. The Kailasa temple, an entire monolithic structure carved from a single rock, is an awe-inspiring example of ancient Indian architecture. The Elephanta Caves, located off the coast of Mumbai, are dedicated to the Hindu god Shiva and feature intricate sculptures and carvings. Now the property includes twelve major forts 11 forts are in Maharashtra and one fort is Ginji in Tamilnadu .These forts such as Raigad, Shivneri, Shindhudurg ,Panhala , Pratapgad, Lohagad, ,Vijaydurg,and Khanderi . Salher, Shuvarndurg, Rajgad were built, adopted or expanded by the Marathas between 17th century to 19th century. Strategically located on costal and sahyadri mountainous terrain, they formed a complex defense system and also trade protection and territorial control.

Tourism Potential in Maharashtra

Maharashtra is the third largest State of India, both in area and population. It is located on the West Coast of India with a 720 km long coastline along the lush green Konkan region. Nestled in the Western Ghats and the Sahyadri mountain range are several hill stations and water reservoirs with semi-evergreen and deciduous forests. The Vidarbha region of Maharashtra, with its dense forests, is home to several wild life sanctuaries and nature parks. Thus all the three regions of Maharashtra offer considerable tourism potential. Maharashtra abounds in numerous tourist attractions ranging from ancient cave temples, unspoiled beaches, ancient forts and monuments, forests and wildlife, unique hill stations, pilgrimage centers, and a rich tradition of festivals, art and culture.

Promoting Cruise Tourism

The Indian middle class is expanding, and with it, the demand for leisure travel. Cruise tourism is still a novel concept in India, and Maharashtra intends to tap into this growing market. Maharashtra, with its extensive coastline stretching over 720 kilometers along the Arabian Sea, holds significant potential for cruise tourism. The state has 2 major, 48 minor ports and major rivers. Maharashtra's coastal climate is tropical, with the main tourist season running from October to March, which coincides with the peak cruising season in the region. This allows for optimal utilization of cruise tourism potential.

Benefits of tourism :-

- Increase in employment.
- Socio economic development of areas.
- Increase in Maharashtra's share in world tourism.
- Stimulation of business activity.
- Increase in business diversity.
- Increase in taxes collected .
- Increase in sale of goods and services .
- Increase in community pride and concern for community history, culture, attractions and artifacts.
- Conservation or restoration of historic sites or attractions.
- Conservation of natural resources as a tourist attraction.

State Tourism Policy:-

The tourism policy of the state aims at achieving a planned growth in tourism, generating employment, protecting natural & cultural resources in an ecologically sustainable manner and promoting arts & handicrafts of different regions in the State. It has entrusted all commercial & promotional activities to Maharashtra Tourism Development Corporation (MTDC), which has identified four thrust areas having highest tourism potential. These are Ajantha-Ellora, Elephanta, Sindhudurg district and Lonar crater. MTDC is also taking initiative in developing Forest tourism. The state has formulated and adopted a policy for tourism development (1993) in consultation with the representative of the travel trade, travel writers and Central govt. agencies.

Role of state govt. in tourism development

Maharashtra tourism development corporation (MTDC) has been established under companies act for systematic development of tourism with an authorised capital of Rs. 25 crores. The paid up share capital as on 31st March 2001 is Rs. 1462.38 lakhs. The corporation receives from the state government financial assistance in the form of share capital contribution. The state government has entrusted all commercial and promotional tourism activities to this corporation.

The state will ensure that its natural and cultural resources will be enhanced with the help of tourism activities and nothing that disturbs the ecological balance will be permitted.

Maharashtra Government Subsidies For Hotel, Motel, Restaurant, And other Tourism Projects :-

Maharashtra Government has launched the Maharashtra Tourism Policy 2024. This comprehensive policy aims accumulate the tourism development for business investing in tourism related projects such as hotels, motels, restaurants and other ventures in the sector in this blog, we explore the various benefits under Policy 2024 including fiscal and non fiscal subsidies and now they have help boost our tourism business. The Maharashtra Government Policy is a strategic initiative to attractive privet investment in tourism industry and promote sustainable tourism and create employment opportunities. It has task of investors worth 1,00,000 crored over the next 10 years. These projects can include hotels, motels, restaurants, resorts, meetings, conferences, exhibitions, festivals, venues, destination wedding location and other related business.

Some benefits of Tourism Subsidy that business

- 1) financial Support- For helping create structures, promotions and procuring the relevant appliances.
- 2) Employment Generation – To provides employments to the people through infrastructure .
- 3) Infrastructure Development- The services being offered to tourists and increase the hospitality services including food, accommodation and transport amenities.
- 4) Cultural Preservation - Arts and traditions besides allowing tourists experience unadulterated regional culture folk arts.

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E-Commerce and E-Banking Digitalisation as Pillars of Viksit Bharat 2047**Author: Prof. Pratik Sadanand Sawant**Institution: D R Mane Mahavidyalay Kagal,
Tal. Kagal, Dist. Kolhapur – 416216**Abstract**

The vision of Viksit Bharat 2047 aims to transform India into a fully developed nation by the centenary of its independence. Digital transformation is central to this goal, particularly through the rapid growth of e-commerce and e-banking. These sectors have reshaped consumer behaviour, improved financial inclusion, enhanced transparency, and strengthened economic efficiency. The integration of digital payments, online marketplaces, and banking technology has enabled inclusive growth, supported entrepreneurship, and accelerated economic formalization. This paper examines the growth trajectory of e-commerce and e-banking in India, their economic contribution, challenges faced, and policy recommendations to ensure sustainable development. The study highlights that digital commerce and financial digitalization are not merely technological advancements but strategic pillars for achieving inclusive, innovative, and globally competitive development by 2047.

Keywords: E-Commerce, E-Banking, Digital India, Financial Inclusion, Viksit Bharat 2047

1. Introduction

India's aspiration to become a developed nation by 2047, known as *Viksit Bharat 2047*, rests on inclusive growth, technological innovation, economic resilience, and global competitiveness. In this transformation journey, digitalisation plays a foundational role. Two major components of digitalisation—e-commerce and e-banking—have significantly altered India's economic structure.

E-commerce refers to the buying and selling of goods and services through electronic platforms, while e-banking enables customers to perform banking transactions digitally without visiting physical branches. Together, these systems have increased convenience, improved accessibility, and strengthened transparency in financial transactions.

With initiatives such as Digital India, Jan Dhan Yojana, and the Unified Payments Interface (UPI), India has created a strong digital ecosystem. The synergy between online marketplaces and digital banking platforms has empowered consumers, supported small businesses, and enhanced economic participation. This paper examines how these two sectors function as critical pillars in achieving the long-term developmental vision of Viksit Bharat 2047.

2. Review of Literature

Existing literature highlights digitalisation as a catalyst for economic growth and financial inclusion. Studies suggest that e-commerce improves market access for small and medium enterprises (SMEs) and enhances supply chain efficiency. Researchers have observed that online platforms reduce transaction costs and increase competition, thereby benefiting consumers.

Scholarly works on e-banking emphasize its role in promoting financial inclusion, especially in developing economies. Digital banking services such as mobile banking, internet banking, and digital wallets reduce dependency on physical infrastructure and expand access to underserved populations.

Recent studies indicate that the integration of fintech innovations with banking systems has enhanced transaction speed, transparency, and security. Literature also suggests that digital financial ecosystems strengthen formalization of the economy, increase tax compliance, and improve governance.

However, scholars have also pointed out challenges such as cybersecurity threats, digital divide, and regulatory concerns. The literature collectively establishes that while digitalisation drives growth, strategic policy interventions are essential for sustainable development.

3. Objectives of the Study

The study is based on the following objectives:

1. To analyse the growth of e-commerce in India.
2. To examine the expansion of e-banking digitalisation.
3. To assess their contribution to economic development.
4. To identify major challenges in digital commerce and banking.
5. To propose policy recommendations aligned with Viksit Bharat 2047.

4. Research Methodology

This study adopts a descriptive and analytical research design to examine the role of e-commerce and e-banking digitalisation in supporting the vision of Viksit Bharat 2047. The descriptive approach helps in explaining the current status, growth patterns, and structural development of digital commerce and banking systems in India. The analytical approach is used to evaluate trends, identify relationships, and interpret the economic and developmental impact of these digital sectors. This combined approach ensures a comprehensive understanding of how digitalisation contributes to national development.

The study is primarily based on secondary data, which has been collected from reliable and authentic sources. These sources include government reports, policy documents, and publications from institutions such as the Reserve Bank of India and the Ministry of Electronics and Information Technology. Additional data has been obtained from academic journals, research papers, books, digital economy reports, and industry publications. These sources provide valuable information on digital payment trends, growth of e-commerce platforms, financial inclusion, and the expansion of e-banking services in India.

The data collection process involved a systematic review and evaluation of published materials. Relevant information was carefully selected, organized, and analysed to ensure accuracy and relevance to the research objectives. Statistical reports and digital transaction data were used to understand growth patterns and technological adoption. Academic literature was reviewed to understand theoretical concepts, previous findings, and emerging trends related to digitalisation and economic development.

The analysis of the data was conducted using trend analysis, comparative analysis, and interpretative methods. Trend analysis was used to examine the growth of digital transactions, online retail, and e-banking usage over time. Comparative analysis was used to evaluate changes in traditional banking and retail systems compared to digital platforms. Interpretative analysis was used to understand the broader implications of digitalisation for economic growth, financial inclusion, and national development.

The scope of the study is limited to the Indian digital economy, with specific focus on e-commerce and e-banking sectors. The study examines their contribution to economic development, employment generation, financial inclusion, and technological advancement. It also evaluates their relevance in achieving the national vision of Viksit Bharat 2047. The study does not involve primary data collection such as surveys or interviews and is limited to the analysis of available secondary information.

Despite its comprehensive approach, the study has certain limitations. Since it relies on secondary data, the findings depend on the accuracy and availability of published information. Rapid technological changes and evolving digital ecosystems may also influence future outcomes. However, the use of credible sources and systematic analysis ensures that the study provides meaningful insights into the role of digitalisation in India's development journey.

5. Growth of E-Commerce in India

India's e-commerce sector has experienced rapid expansion over the past decade. Increased smartphone penetration, affordable internet services, and rising digital literacy have fuelled this growth. Online marketplaces have expanded from metropolitan cities to Tier-2 and Tier-3 towns.

The introduction of digital payment systems such as UPI has simplified transactions, reducing reliance on cash. Consumer confidence in online shopping has increased due to improved logistics, faster delivery models, and secure payment systems.

The COVID-19 pandemic further accelerated digital adoption. Lockdowns encouraged consumers to purchase groceries, medicines, and essentials online. This shift in behaviour continued even after restrictions were lifted, indicating long-term structural transformation.

Today, e-commerce platforms serve millions of customers daily, connecting producers directly with consumers. The growth of quick commerce and hyperlocal delivery has further enhanced speed and efficiency in retail services.

6. Expansion of E-Banking and Digital Payments

The scope of e-commerce and e-banking in India is expanding beyond urban markets. Rural digitalisation initiatives, improved connectivity, and government schemes have enabled broader participation.

E-commerce now includes sectors such as education technology, healthcare services, digital entertainment, and online professional services. Similarly, e-banking has evolved to include mobile banking, digital lending, online investment platforms, and fintech innovations.

The integration of artificial intelligence, blockchain, and data analytics is expected to improve personalization, risk assessment, and operational efficiency. Cross-border e-commerce is also expanding, allowing Indian businesses to access global markets.

By 2047, digital platforms are expected to integrate seamlessly with supply chains, smart cities, and digital governance systems, creating a comprehensive digital economy.

7. Contribution to Financial Inclusion and Economic Development

E-commerce and e-banking contribute significantly to economic development in the following ways:

1. **Employment Generation:** Digital platforms create direct and indirect employment in logistics, technology, customer service, and financial services.
2. **Financial Inclusion:** E-banking services bring unbanked populations into the formal financial system, enabling access to savings, credit, and insurance.
3. **Support to MSMEs:** Online platforms provide small businesses with access to national and international markets, reducing entry barriers.
4. **Increased Transparency:** Digital transactions reduce cash dependency, enhance accountability, and improve tax compliance.
5. **Boost to GDP:** The digital economy contributes to GDP growth by increasing productivity, efficiency, and consumer spending.
6. **Women and Youth Empowerment:** Digital platforms enable entrepreneurship among women and youth by reducing capital and infrastructure requirements. Together, these contributions align closely with the goals of inclusive and sustainable development under Viksit Bharat 2047.
7. **Challenges in Digital Commerce and Banking:** Despite rapid expansion, challenges persist. Cybersecurity threats, data privacy concerns, and digital fraud undermine public trust. Limited digital literacy and infrastructure gaps in rural areas restrict equitable access. Regulatory complexities may affect innovation and compliance for fintech firms. Addressing these challenges requires robust cybersecurity frameworks, data protection regulations, and digital awareness initiatives. Bridging rural-urban digital divides is essential to ensure balanced and sustainable digital transformation.

8. Challenges Faced

Despite rapid progress, several challenges remain:

1. **Digital Divide:** Limited internet access in remote areas restricts participation.

2. Cybersecurity Risks: Online fraud, hacking, and data breaches threaten consumer trust.
3. Regulatory Issues: Rapid innovation sometimes outpaces regulatory frameworks.
4. Infrastructure Gaps: Logistics and digital infrastructure need continuous upgrading.
5. Data Privacy Concerns: Protection of consumer information remains critical.
6. Financial Literacy Gaps: Many citizens lack awareness of digital financial tools.

Addressing these challenges is essential to ensure inclusive and sustainable growth.

9. Policy Recommendations

To strengthen e-commerce and e-banking as pillars of Viksit Bharat 2047, the following policy measures are recommended:

1. Strengthen Digital Infrastructure: Expand high-speed internet access in rural and remote areas.
2. Enhance Cybersecurity Frameworks: Implement strong data protection laws and security standards.
3. Promote Digital Literacy: Conduct nationwide awareness campaigns on digital transactions.
4. Support MSMEs: Provide training, financial incentives, and easier onboarding on digital platforms.
5. Encourage Innovation: Support fintech startups through funding and regulatory sandboxes.
6. Strengthen Consumer Protection Laws: Ensure grievance redressal mechanisms are efficient and transparent.
7. Promote Green Digitalisation: Encourage sustainable logistics and energy-efficient digital infrastructure.

10. Future Outlook toward Viksit Bharat 2047

By 2047, India is expected to become a global digital leader. E-commerce and e-banking will likely integrate with emerging technologies such as artificial intelligence, blockchain, and digital currencies. Digital financial ecosystems may enable real-time cross-border transactions, paperless governance, and smart contract-based trade systems. Increased formalization of the economy will enhance revenue collection and fiscal stability.

The convergence of digital commerce, digital banking, and digital governance will create a transparent, efficient, and inclusive economic system. If supported by effective policies and infrastructure, these sectors can drive India toward high-income status and global competitiveness.

11. Conclusion

E-commerce and e-banking digitalisation represent transformative forces in India's development journey. They enhance financial inclusion, promote entrepreneurship, generate employment, and improve economic transparency. While challenges such as cybersecurity risks and digital divide remain, strategic policy interventions and technological innovation can overcome these barriers.

As India approaches its centenary of independence in 2047, digital transformation will be central to achieving the vision of Viksit Bharat. E-commerce and e-banking are not merely service sectors but foundational pillars supporting economic modernization, inclusive growth, and global integration. Strengthening these sectors will ensure that India's developmental aspirations become a sustainable reality.

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Startup and Entrepreneurship Development under Union Budget 2026: A Policy Analysis**Mrs. Ranjana Rahul Bagal**Research Scholar,
Department of Commerce
& Management,
Shivaji University, Kolhapur**Abstract:**

The Union Budget 2026 introduces targeted reforms to strengthen startup and entrepreneurship development in India through enhanced financial support, tax incentives, regulatory simplification, and improved market access. By launching a ₹10,000 crore SME Growth Fund, expanding tax exemptions under Section 80-IAC (including extended benefits for DeepTech startups), and easing procurement norms via the GeM portal, the government aims to address structural challenges faced by emerging enterprises. This paper examines how these measures contribute to strengthening entrepreneurial ecosystems, facilitating business scalability, and fostering innovation-driven economic growth. The study argues that the Budget marks a transition from startup promotion to structured entrepreneurial development.

Keywords: Startup development, Entrepreneurship policy, SME Growth Fund, Tax incentives, DeepTech startups, Startup ecosystem, India

Introduction:

Startup and entrepreneurship development has become a central driver of India's economic growth, innovation capacity, and employment generation. Over the past decade, India has emerged as one of the world's largest startup ecosystems, supported by various policy initiatives promoting innovation and business formation. Despite this progress, entrepreneurs continue to face significant challenges such as limited access to growth capital, regulatory complexities, delayed payments, and restricted market access. Therefore, effective entrepreneurship development requires a comprehensive and supportive ecosystem that integrates financial assistance, tax incentives, simplified compliance systems, and institutional backing to enable startups to transition from early-stage survival to sustainable expansion and competitiveness.

The Union Budget 2026–27 introduces targeted measures to strengthen startup and entrepreneurship development through enhanced financial and policy support. The establishment of a ₹10,000 crore SME Growth Fund and the additional ₹2,000 crore allocation to the Self-Reliant India (SRI) Fund aim to bridge the growth capital gap and support micro and small enterprises. Continued angel tax exemptions and extended tax benefits under Section 80-IAC providing 100% tax deduction on profits for three consecutive years within the first 10 years, and up to 20 years for deep tech startups reduce financial pressure and encourage long-term innovation. Furthermore, regulatory simplification, eased compliance, improved access to the GeM portal, mandatory TReDS usage for timely payments, and customs duty exemptions on critical inputs collectively aim to create a robust, innovation-driven entrepreneurial ecosystem that supports startups in scaling into competitive and globally recognized enterprises.

Objectives:

1. To examine the startup-focused provisions in Union Budget 2026–27.
2. To analyse the impact of financial, tax, and regulatory measures on entrepreneurship development.
3. To assess how the Budget supports startup growth, sustainability, and market access.

Research Methodology:

This study follows a **descriptive research design** and is based on **secondary data** collected from Union Budget 2026–27 documents, government reports, and related research articles. A **policy analysis approach** is used to examine how the Budget's financial, tax, and regulatory measures support startup and entrepreneurship development. The study is limited to theoretical analysis, as long-term impact data is not yet available.

Conceptual Framework: Startup and Entrepreneurship Development:

Entrepreneurship development is a structured process of promoting, supporting, and sustaining startups and enterprises to create economic and social value. It involves nurturing businesses through stages like idea generation, funding, scaling, and expansion, while creating an ecosystem that reduces barriers and fosters long-term growth.

- 1. Access to Finance:** Startups need capital at all stages seed, early, and growth. Financial support from equity funds, venture capital, angel investors, and government programs ensures liquidity, reduces risk, and enables innovation.
- 2. Regulatory and Tax Support:** Simplified registration, reduced compliance, rationalized penalties, and tax incentives improve retained earnings, ease operations, and build investor confidence.
- 3. Market Access:** Access to domestic and international markets, government procurement, and e-commerce platforms ensures revenue sustainability, brand credibility, and growth opportunities.
- 4. Innovation Ecosystem Support:** Incubators, accelerators, research institutions, mentorship networks, and technology collaborations provide technical expertise, knowledge sharing, and innovation opportunities, especially for DeepTech and AI startups.
- 5. Operational Ease:** Simplified procedures, faster approvals, timely payments, and efficient digital platforms reduce operational challenges, improve cash flow, and allow startups to focus on growth and innovation.

Financial Support for Startup Development:**1. ₹10,000 Crore SME Growth Fund**

The establishment of a ₹10,000 crore SME Growth Fund provides equity-based financial support to high-growth startups and small enterprises. Unlike traditional debt financing, equity support reduces repayment burdens and allows startups to reinvest profits into expansion and innovation.

Impact on Entrepreneurship Development:

1. Bridges the growth capital gap.
2. Encourages risk-taking and innovation.
3. Reduces dependence on foreign venture capital.
4. Strengthens domestic entrepreneurial ecosystems.

2. Strengthening the Self-Reliant India (SRI) Fund

An additional ₹2,000 crore allocation enhances funding access for micro and small enterprises, particularly in emerging sectors.

Developmental Significance:

1. Promotes inclusive entrepreneurship.
2. Supports rural and non-metro startups.
3. Encourages local manufacturing and innovation.

3. Angel Tax Exemption Continuation

The continuation of tax protection on investments above fair market value ensures investor confidence and reduces funding-related uncertainties.

Entrepreneurial Impact:

1. Encourages early-stage funding.
2. Improves startup valuation flexibility.
3. Strengthens investor-startup relationships.

Tax Incentives and Regulatory Simplification:**1. Extended Tax Holiday (Section 80-IAC)**

Startups are eligible for a 100% tax deduction on profits for three consecutive years within the first 10 years, extended up to 20 years for DeepTech ventures.

Significance for Entrepreneurship:

1. Enhances retained earnings.
2. Supports long-gestation innovation sectors.
3. Improves business sustainability during initial growth stages.

2 Compliance Reduction

Simplified compliance procedures and eased penalties reduce administrative burdens on entrepreneurs.

Impact:

1. Saves time and operational costs.
2. Enhances ease of doing business.
3. Encourages formalization of startups.

Market Access and Institutional Support:

1. Government e-Marketplace (GeM) Reforms

Startups are granted exemptions from prior turnover and experience requirements and are provided waivers on Earnest Money Deposit (EMD) for government tenders.

Entrepreneurship Benefits:

1. Expands revenue opportunities.
2. Builds credibility and visibility.
3. Facilitates entry into public procurement markets.

2. Mandatory Use of TReDS

Compulsory adoption of the Trade Receivables Discounting System (TReDS) by CPSEs ensures timely payments to MSMEs and startups.

Developmental Impact:

1. Improves working capital cycles.
2. Reduces liquidity constraints.
3. Strengthens financial stability of startups.

Focus on Innovation-Driven Entrepreneurship:

The Budget emphasizes Artificial Intelligence (AI), DeepTech, and sustainable ventures. Customs duty exemptions on critical inputs for electronics and healthcare innovation further reduce operational costs.

Implications for Startup Development:

1. Encourages technology-based entrepreneurship.
2. Promotes research and development.
3. Positions India as a global innovation hub.

Economic and Developmental Outcomes:

The Budget's startup-focused measures contribute to:

1. Increased startup survival rates
2. Greater innovation intensity
3. Employment generation
4. Regional entrepreneurial development
5. Strengthened domestic value chains

By addressing capital access, regulatory efficiency, and market integration, the policy framework supports the transition from early-stage startups to scalable enterprises.

Challenges in Implementation:

Despite strong policy design, the success of these initiatives depends on:

1. Transparent fund allocation mechanisms
2. Efficient coordination between ministries
3. Awareness among grassroots entrepreneurs
4. Monitoring and evaluation frameworks

Ensuring equitable access across regions and sectors remains critical for inclusive entrepreneurship development.

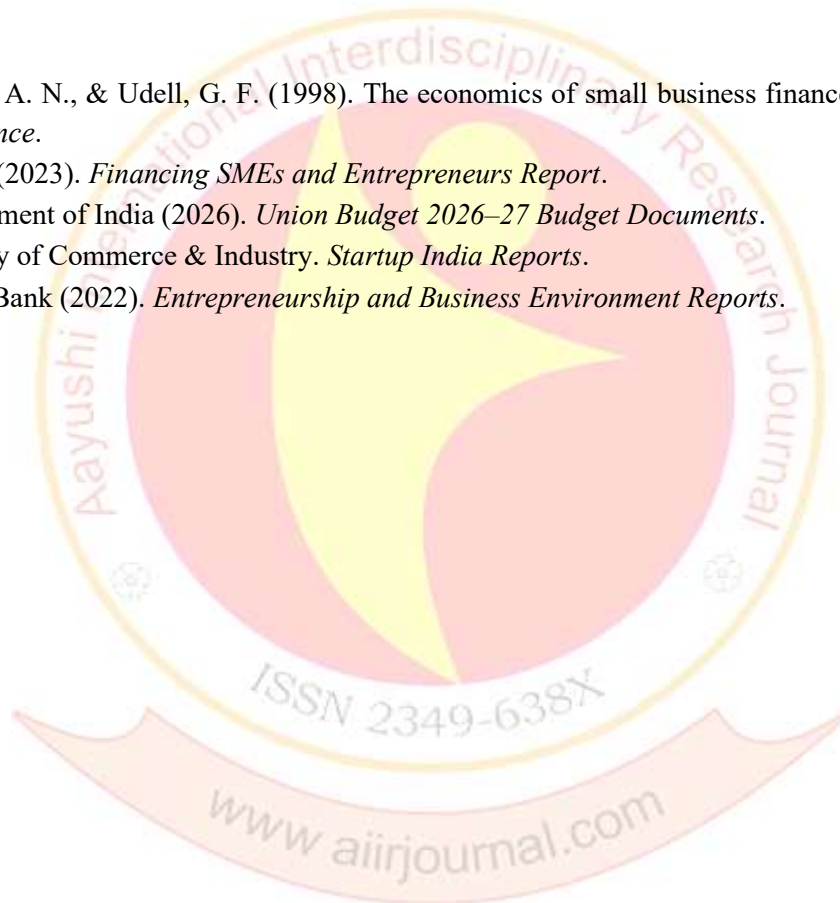
Conclusion:

The Union Budget 2026–27 represents a strategic step toward strengthening startup and entrepreneurship development in India. Through integrated measures financial support, tax incentives, regulatory simplification, and procurement reforms the government aims to create a supportive and growth-oriented entrepreneurial ecosystem.

If implemented effectively, these initiatives can transform startups into high-growth enterprises, enhance innovation capacity, and contribute significantly to economic development and job creation.

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Sustainable Development through Kaizen: A Case Study on the Elimination of Face Flange Shrinkage in the Casting Process at ABC Industries

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Abstract

In today's highly competitive manufacturing environment, continuous improvement is essential for enhancing product quality, reducing costs, and increasing customer satisfaction. Kaizen, a Japanese philosophy of continuous improvement, focuses on small, incremental improvements with active employee involvement. This research paper presents a Kaizen-based case study conducted at Mutha Industries to eliminate excess face flange shrinkage observed after machining in a casting component. The defect resulted in a rejection rate of 3.52%, leading to increased scrap generation and production losses. A structured Kaizen methodology was applied using the 5-Why analysis technique to identify the root cause of the problem. The analysis revealed that insufficient ingate size due to inadequate design consideration during the development stage was responsible for the shrinkage defect. As a corrective action, the ingate size was extended toward the casting side by 4 mm. Following implementation, the rejection rate was successfully reduced to 0%. This study highlights the effectiveness of Kaizen in achieving quality improvement through simple, low-cost solutions.

Keywords -Kaizen, Casting Defects, Face Flange Shrinkage, 5-Why Analysis, Quality Improvement,

1. Introduction

In today's highly competitive manufacturing environment, organizations face challenges such as changing customer requirements, market uncertainty, and global competition. Continuous improvement in product quality has therefore become a critical source of competitive advantage. To address these challenges, industries widely adopt quality management and improvement methodologies, among which Kaizen plays a significant role.

Kaizen, originating in Japan, emphasizes continuous and incremental improvement in processes with the involvement of employees at all organizational levels. It focuses on improving product quality, reducing manufacturing costs, eliminating waste, and enhancing operational efficiency. Rather than relying on major innovations, Kaizen achieves sustainable improvements through small, consistent changes that gradually become part of the organizational culture.

Casting processes, commonly used in automotive and industrial component manufacturing, are prone to defects such as shrinkage and dimensional inaccuracies, leading to rework and rejection. Face flange shrinkage after machining is a critical defect that affects product quality and customer satisfaction.

This paper presents a Kaizen-based case study conducted at ABC Industries to eliminate face flange shrinkage after machining. The study applies the 5-Why analysis technique to identify root causes and implement effective corrective actions, demonstrating the practical effectiveness of Kaizen in improving casting quality and reducing manufacturing losses.

2. Literature Review

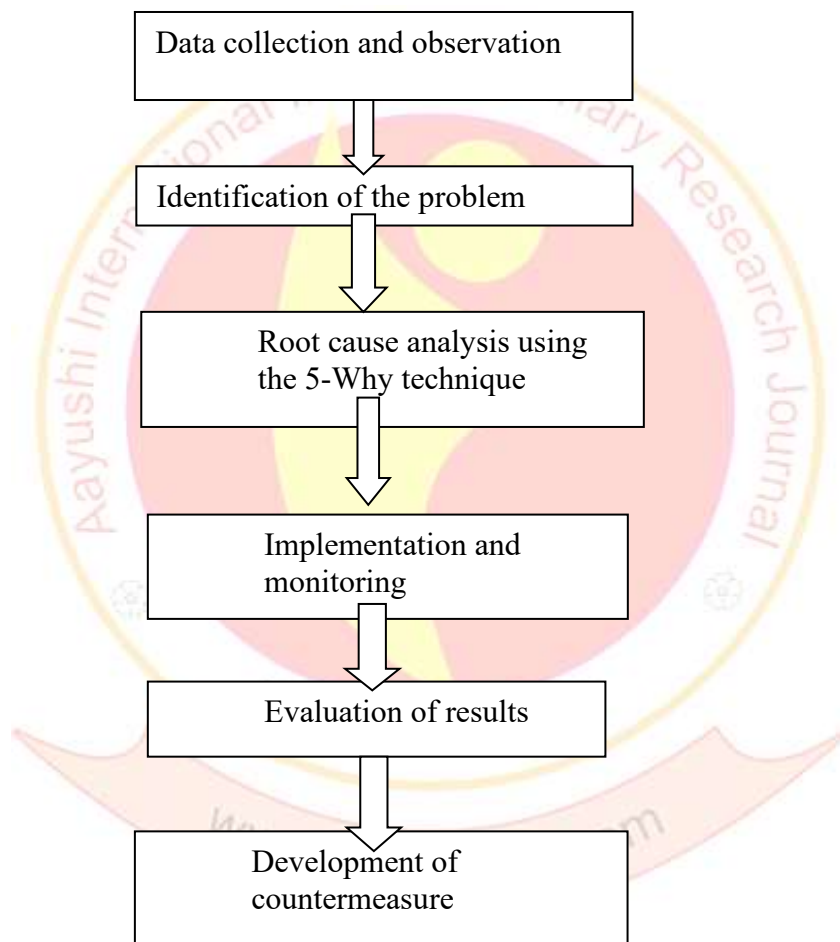
Masaaki Imai (1986) introduced Kaizen as a continuous improvement philosophy emphasizing employee involvement, process-oriented thinking, standardization, and waste elimination to achieve long-

term organizational success. Brunet and New (2003) highlighted that Kaizen supports systematic problem-solving through tools such as PDCA cycles and 5 Why analysis, improving operational control and employee participation. Studies in Indian manufacturing SMEs, including Singh and Singh (2015), reported that Kaizen implementation leads to reduced rejection rates, improved productivity, and enhanced employee motivation with minimal investment. Furthermore, research in casting and machining industries confirms that Kaizen effectively reduces defects such as shrinkage and dimensional variations, establishing it as a cost-effective and sustainable improvement methodology.

3. Objective

- 1) To reduce rejection, rework, and production costs associated with casting defects through continuous improvement practices.
- 2) To evaluate the effectiveness of Kaizen implementation in enhancing process stability, component reliability, and customer satisfaction

4. Kaizen Methodology Adopted



Data Collection

Data were collected from production and quality records of the manufacturing department at ABC Industries. Rejection data, scrap reports, and inspection records were analyzed to identify the face flange shrinkage defect, which had a rejection rate of 3.52%. Process observations, casting design details, and ingate dimensions were reviewed through shop-floor studies and team discussions. Post-implementation data were collected to evaluate the reduction in rejection rate and improvement in product quality.

Kaizen Concept

Kaizen is a Japanese concept in which “*kai*” means change and “*zen*” means good or better, together signifying continuous improvement for the better. The foundations of this concept were laid during the rebuilding of Japanese industry after World War II. During this period, American quality experts W. Edwards Deming and Joseph M. Juran emphasized the importance of continuous improvement for the development of Japanese industries. Subsequently, credit for formalizing the principles and popularizing the Kaizen concept is largely attributed to Masaaki Imai, a Toyota engineer. He successfully implemented the Kaizen philosophy for waste reduction and quality improvement in manufacturing. His book, *Kaizen: The Key to Japan’s Competitive Success* (1986), brought global recognition to the Kaizen concept.

Principles of Kaizen

1. Small-Step Improvements

Kaizen emphasizes making small, incremental improvements rather than relying on major innovations. It is based on the belief that no product, process, or result is ever perfect and there is always scope for improvement. Even minor changes in products, production methods, or employee work practices can collectively lead to significant and sustainable success for an organization.

2. Continuous Improvement

Kaizen is not a one-time initiative or a short-term program; rather, it is an ongoing and continuous process. Organizations practicing Kaizen strive to make regular, incremental improvements in all areas of business operations. Continuous improvement enables organizations to respond effectively to changing market conditions, technological advancements, and customer expectations.

3. Participation and Coordination of All Employees

Kaizen emphasizes the involvement of all employees, from top management to shop-floor workers, in identifying problems and implementing improvements. Each employee is responsible for improving their own work, while teamwork is encouraged to solve organizational issues. This collective participation enhances coordination, motivation, and overall organizational development.

5. Process Orientation

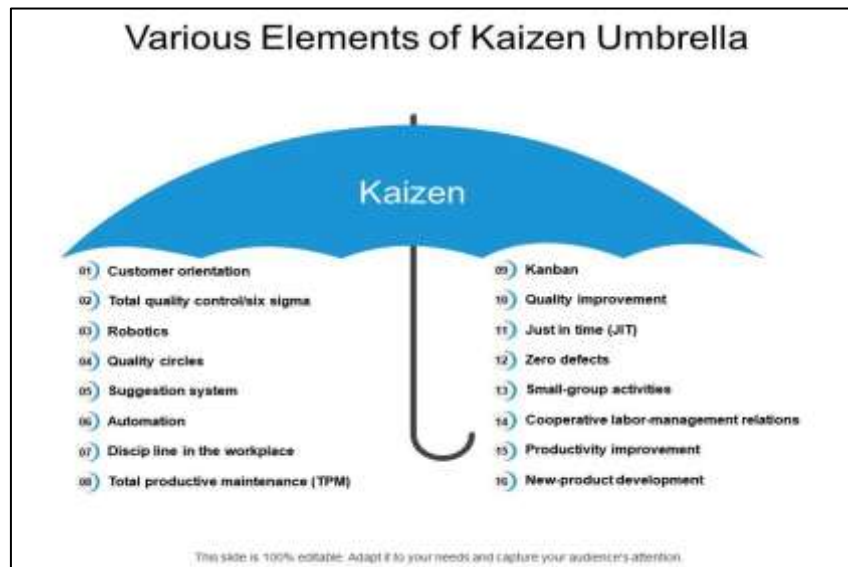
Kaizen focuses not only on improving product quality but also on continuously improving the processes used to produce those products. In manufacturing industries, each process is interconnected with others. Kaizen aims to optimize these processes by eliminating waste, reducing unnecessary activities, and improving workflow efficiency, thereby enhancing overall productivity and quality.

4. Customer Orientation

Customer satisfaction is the primary objective of any business organization. Kaizen promotes continuous improvement of products and services in line with customer needs and expectations. By reducing defects, controlling costs, and eliminating non-value-adding activities, organizations can deliver high-quality products at competitive prices, leading to increased customer satisfaction and loyalty.

Kaizen Umbrella

Continuous improvement is not limited to a few departments or specific tools within an organization. Instead, it involves the participation of every function and individual, fostering a strong Kaizen culture across the entire business. Through this culture, all activities are continuously evaluated and improved. As various Japanese management and production techniques are systematically enhanced through Kaizen, the concept of the **Kaizen Umbrella** emerged, representing Kaizen as an overarching philosophy that integrates and sustains continuous improvement initiatives throughout the organization.



Company Profile –ABC Industries

ABC is a renowned manufacturing company located in Satara, specializing in high-quality industrial and automotive components. The company has been adopting Japanese manufacturing technologies for several years and follows modern practices with a strong focus on quality, productivity, and continuous improvement. Casting is a critical production stage where dimensional accuracy and surface integrity are essential to meet customer requirements. To promote continuous improvement, the company encourages employee participation through Kaizen competitions. Shop-floor employees, with their direct operational experience, effectively identify problems and suggest practical solutions, making Kaizen an important driver of employee involvement and organizational improvement.

Problem Identification

During routine quality inspections, it was observed that a specific casting component exhibited excessive face flange shrinkage after machining. This defect led to an increase in the product rejection rate by 3.52%, along with a rise in scrap generation. Consequently, there was significant wastage of time, labor, and raw materials, which resulted in a substantial increase in overall production costs. Additionally, the higher rejection rate negatively impacted customer satisfaction. To address this issue and reduce customer rejections, the Kaizen technique was adopted as a systematic approach for identifying root causes and implementing effective corrective actions.

6. Root Cause Analysis Using 5-Why Technique

When a problem arises in a business, repeatedly addressing its symptoms does not lead to a permanent solution. Therefore, the **5 Why analysis** is used to identify the root cause of the problem. This technique involves asking the question “why” repeatedly—typically five times—until the fundamental cause of the issue is uncovered. By identifying the true root cause, effective corrective and preventive actions can be implemented, thereby ensuring that the problem does not recur.

The 5-Why analysis was carried out to identify the root cause of face flange shrinkage:

Why Level	Observation
1st Why	Excess solidification time
2nd Why	Less molten metal available to fill the casting cavity
3rd Why	Ingate size was less compared to casting cavity
4th Why	Inadequate design consideration
5th Why	Design consideration overlooked during product development

Root Cause Identified

The root cause of the problem was inadequate design consideration during the development stage, specifically insufficient ingate size, which restricted molten metal flow and caused shrinkage during solidification.

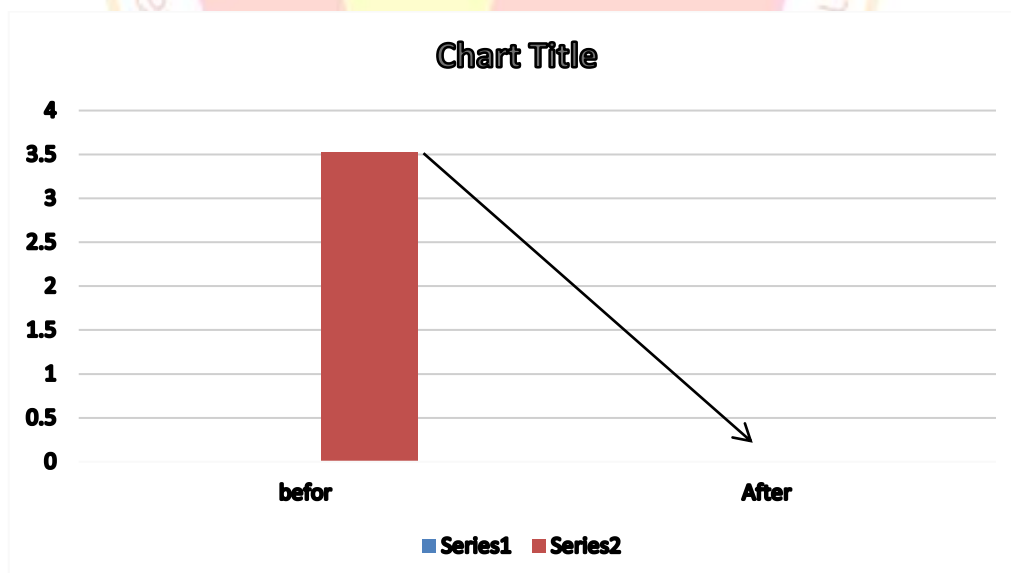
7. Kaizen Idea Implementation

According to Kaizen principles, the countermeasure should directly address and counteract the identified root cause of the problem. In this case, the root cause of excessive face flange shrinkage was identified as insufficient molten metal flow into the casting cavity, primarily due to an undersized ingate. Restricted metal flow resulted in premature solidification, which led to shrinkage defects after machining. Based on this analysis, the proposed Kaizen idea focused on enhancing the flow characteristics of the molten metal during the casting process. To implement this improvement, a modification was made to the existing gating system. Countermeasure Implemented -The ingate size was extended toward the casting side by **4 mm**. This design modification ensured an adequate and continuous flow of molten metal into the mold cavity during the solidification phase.

No major investment was required, and the change was implemented using existing resources, demonstrating the effectiveness of Kaizen as a low-cost improvement approach.

Results and Discussion

Calculation	Kaizen Implematon		% In
	Befor	After	
Monthly Schedule QTY	7,000	7,000	0%
Casting Weight	2.07	2.07	0%
Face SKG Rejection %	3.52	0.00	100%
Casting Rejected	155.00	0.00	100%
Conversion Cost	202.05	202.05	-
Monthly Saving	-	31,318	-
Annual Savings	-	3,75,813.0	-



After implementing the improvement idea, the face flange shrinkage rejection rate was successfully reduced from 3.52% to 0%. This initiative not only enhanced product quality but also led to significant cost savings of ₹31,318 per month and ₹3,75,813 annually. Furthermore, customer satisfaction improved due to

the consistent supply of defect-free products. The active participation of employees in the Kaizen implementation also contributed to improved employee morale and engagement.

11 Conclusion

This research paper demonstrates the successful application of Kaizen methodology to eliminate a critical casting defect at Mutha Industries. Through systematic root cause analysis using the 5-Why technique, the actual cause of face flange shrinkage was identified as inadequate design consideration during the development stage. A simple and effective countermeasure involving ingate size extension resulted in zero rejection. The study confirms that Kaizen is a powerful tool for continuous improvement and quality enhancement in manufacturing organizations.

12 Suggestion

- Other business problems can be reduced by using Kaizen techniques.
- It would be more beneficial to train employees to create awareness about the use of other Japanese management technologies.

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To study the impact on farmers income and standard of living**Mr. Ravindra Suresh Jamdade**

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Abstract

This study investigates the impact of agro-processing units on the financial condition of farmers in Satara District, a prominent agricultural region in Maharashtra, India. The district is known for its production of fruits (especially grapes and strawberries), sugarcane, and dairy, supported by a network of processing units like sugar factories, dairy cooperatives, and wineries. The primary objective was to analyze the effect of these linkages on farmers' income, price stability, and overall financial risk. A descriptive research design was employed, collecting primary data from 40 farmers through a structured questionnaire. Secondary data was gathered from district agricultural offices and published reports. Findings indicate that farmers linked with agro-processing units experience significantly higher and more stable incomes, better access to inputs and credit, and reduced market risks compared to their non-linked counterparts. However, challenges such as delayed payments and quality standards persist. The study concludes that agro-processing unit's play a vital role in enhancing farmers' financial conditions and recommends policy interventions to strengthen these linkages further.

Keywords: *Agro-processing, Farmers' Income, Financial Condition, Satara District, Contract Farming, Agricultural Marketing.*

1. Introduction

Indian agriculture is characterized by small and marginal landholdings, making farmers vulnerable to market fluctuations and price volatility. Agro-processing, which involves transforming raw agricultural produce into value-added products, is recognized as a crucial strategy for rural industrialization, employment generation, and increasing farmers' income. By providing a ready market, ensuring price stability, and reducing post-harvest losses, agro-processing units can significantly improve the financial security of farmers. Satara district presents an ideal case study due to its diverse agricultural base and the presence of major agro-processing industries, including the renowned Sahyadri Farmers Producer Company (FPC), several sugar cooperatives, dairy plants, and a growing number of wineries.

2. Review of Literature

Previous studies consistently highlight the positive correlation between agro-processing and farmer welfare. Deshpande & Bapna (2018) found that sugarcane farmers in Maharashtra attached to sugar cooperatives had higher and more stable incomes. Similarly, studies on dairy cooperatives (Sharma, 2020) emphasize their role in ensuring regular cash flow for livestock owners. However, Kumar & Singh (2019) point out issues like monopolistic behavior and delayed payments in some contract farming models. This study builds on existing literature by providing a contemporary, multi-crop analysis specific to the dynamic agricultural landscape of Satara district. **Dhar and Lydall (1961)** et.al on "Role of Small Enterprises in India's Economic Development". He evaluates the role of small enterprises in India's economic development, particularly in terms of employment-oriented industrialization, and to examine capital, labor, and output relationships across industries. The study analyzed data from the Census of Indian Manufactures (1956) and a study by the Perspective Planning Division of the Planning Commission, focusing on capital,

labor, and output dynamics in various industries. **Prasad (1983)** in his study found that the small scale industrial sector is an integral part of not only the industrial sector, but also of the country's economic structure as a whole. If small scale industries are properly developed, they can provide a large volume of employment, can raise income and standard of living of the people in lower income group and can bring about more prosperity and balanced economic development. Small scale industrial sector has vast potential in terms of creating employment and output, promotion of export, expansion of base for indigenous entrepreneurship and dispersal of industries and entrepreneurship skills in both rural as well as backward areas. **Rajendran (1999)** made a study to examine the various kinds of assistance given to small scale industries with the prime objective of identifying institutional assistance for the development of small scale industries and the problems faced by these industries in Tiruchirapalli district of Kerala. He concluded that the greatest problem faced by the small entrepreneurs was non availability of adequate financial assistance. Moreover, the small enterprises also face problems relating to the acquisition of raw material, marketing of products and technological and administrative problems. There were complicated procedures in availing loans from financial institutions and there is no coordination between the promotional institutions and government agencies.

3. Statement of the Problem:

Despite the establishment of agro-processing units in Satara district, which are expected to enhance farmers' income, reduce post-harvest losses, and create employment opportunities, the actual impact on the financial condition of farmers at the ground level remains unclear. There is a lack of systematic and empirical assessment to determine how effectively these units contribute to improving farmers' economic well-being, addressing challenges, and supporting sustainable agricultural development. This study seeks to bridge this gap by evaluating the real financial outcomes for farmers associated with agro-processing units in the district.

4. Objectives:

1. To assess the impact of agro processing unit on the Financial Condition of Farmers in Satara district.
2. To compare the income levels and stability of farmers linked with agro-processing units versus those who are not.

5. Hypotheses:

H1: There is a significant positive difference in the average annual income of farmers linked with agro-processing units compared to non-linked farmers.

H2: Farmers linked with processing units experience greater price stability for their produce.

6. Research Methodology

The study was conducted in Satara district, Maharashtra, focusing on two talukas Wai Karad and Phaltan where agro-processing units are highly concentrated. A descriptive and analytical research design was adopted. Primary data were collected through a field survey, while secondary data were obtained from the District Agriculture Office, NABARD, and published journals. A multi-stage random sampling technique was employed, with a pilot survey conducted on a sample of 40 farmers to refine the questionnaire and methodology. For the main study, 40 farmers having supply agreements with agro-processing units were randomly selected, along with a control group of 40 farmers from the same region who sold primarily in APMCs or to local traders. Data were collected using a pre-tested, structured questionnaire covering demographics, landholding, crops grown, annual income, marketing patterns, and farmers' perceptions regarding agro-processing units. Data was analyzed using SPSS software. Descriptive statistics (mean, standard deviation) were used for profiling. Inferential statistics, including an independent samples t-test, were used to compare the two groups of farmers and test the hypotheses.

7. Data Analysis, Results, and Discussion

The descriptive statistics provide a preliminary understanding of the impact of agro-processing units on the financial condition of farmers in Satara district. The table presents the number of respondents (N), mean values, and standard deviations for key financial parameters, including annual income, crop yield, marketing efficiency, and profitability. These statistics help summarize the central tendency and variability of the data, offering insights into how engagement with agro-processing units may influence farmers' economic outcomes compared to those who sell primarily through traditional channels. This analysis forms the foundation for further inferential statistical tests to assess the significance of observed differences.

Table:

Descriptive Statistics of the impact of agro processing unit on the Financial Condition of Farmers

S.N	Financial Factors	N	Mean	Std. Dev.
V1	How much of your annual income is influenced by agro-processing units?	40	3.17	1.43
V2	Do you feel economically empowered by associating with agro-processing units?	40	3.47	1.13
V3	How has your savings pattern changed after working with agro-processing units?	40	2.90	1.53
V4	What percentage of your income is reinvested into farming due to agro-processing benefits?	40	3.10	1.21
V5	Do agro-processing units provide financial assistance or credit facilities?	40	4.10	.67
V6	How do agro-processing units affect your borrowing needs?	40	2.60	1.42
V7	Has your financial planning improved after associating with agro-processing units?	40	3.45	1.03
V8	How reliable are the payments made by agro-processing units?	40	2.90	1.53
V9	Do agro-processing units help you mitigate market risks?	40	3.77	.919
V10	Agro-processing units have increased in number in my area over the past 5 years.	40	4.22	1.04
V11	Agro-processing units are actively engaged in purchasing farm produce directly from farmers.	40	4.27	.84
V12	The presence of agro-processing units has improved market linkages for agricultural produce.	40	4.50	.679
V14	I now receive better prices for my farm produce compared to earlier years.	40	4.025	.69
V15	The price I get for my produce is more stable and predictable due to agro-processing units.	40	4.32	.615

Source: Primary data

The descriptive statistics indicate that agro-processing units have had a generally positive impact on the financial condition of farmers in Satara district, though with some variations across different parameters. Farmers reported relatively high agreement on factors such as better market linkages (Mean = 4.50, SD = 0.679), active procurement by agro-processing units (Mean = 4.27, SD = 0.84), and more stable and predictable prices (Mean = 4.32, SD = 0.615), highlighting the crucial role these units play in strengthening market access and income stability. Similarly, financial support through credit facilities (Mean = 4.10, SD = 0.67) and economic empowerment (Mean = 3.47, SD = 1.13) suggest tangible benefits. However, areas such as changes in savings patterns (Mean = 2.90, SD = 1.53), payment reliability (Mean = 2.90, SD = 1.53), and reduced borrowing needs (Mean = 2.60, SD = 1.42) reveal moderate or mixed outcomes, reflecting that not all farmers experience uniform financial advantages. Overall, the findings suggest that while agro-processing units significantly enhance price realization, market linkages, and economic empowerment, challenges remain in ensuring consistent payment reliability, improved savings behavior, and reduced dependency on

external borrowing. Agro-processing units in Satara district have positively influenced farmers' financial conditions by improving market linkages, stabilizing prices, and providing better income opportunities. However, challenges such as inconsistent payment reliability and limited impact on savings and borrowing patterns indicate the need for stronger institutional support and financial integration.

7.1. Impact on Financial Indicators:

1. **Income Level:** The average annual income of farmers linked to processing units was significantly higher (₹4.5 lakhs) than that of non-linked farmers (₹2.8 lakhs). The t-test confirmed that this difference was statistically significant ($t\text{-value} = 5.23, p < 0.01$), leading to the acceptance of **H1**.
2. **Price Stability:** Linked farmers reported minimal fluctuation in the price they received, as most had pre-agreed prices. Non-linked farmers faced high volatility, especially for perishables like tomatoes and grapes. This supports **H2**.
3. **Cost and Risk Reduction:** Linked farmers benefited from timely supply of quality inputs (seeds, fertilizers) and technical guidance from the processing companies, leading to better yields and reduced risk of crop failure.

Table 2:
Comparative Analysis of Key Financial Parameters

Parameter	Farmers Linked with Units	Non-Linked Farmers
Average Annual Income (₹)	450,000	280,000
Standard Deviation of Income (₹)	55,000	120,000
Incidence of Post-Harvest Loss (%)	5%	15%
Satisfaction with Price Received (Scale 1-5)	4.2	2.8

8. Findings of the study

1. Farmers associated with agro-processing units' experienced better price realization, stable income, and stronger market linkages compared to those selling through traditional APMCs or local traders.
2. Despite economic benefits, issues such as irregular payments, limited changes in savings patterns, and continued dependence on external borrowing highlight the uneven financial impact of agro-processing units.

9. Suggestions

1. **Promote FPOs/FPCs:** The government should actively facilitate the formation and strengthening of Farmer Producer Organizations to improve farmers' bargaining power.
2. **Infrastructure Development:** Invest in cold storage chains and packhouses near processing units to minimize post-harvest losses further.
3. **Transparent Contracts:** Ensure legal frameworks for fair contract farming agreements that protect farmers from unfair practices and ensure timely payments.
4. **Skill Development:** Train farmers to meet the quality standards required by processing industries.

10. Conclusions of the study

The study concludes that agro-processing units play a significant role in improving the financial condition of farmers in Satara district by offering better price realization, strengthening market linkages, reducing market risks, and creating opportunities for economic empowerment. Farmers associated with these units reported higher levels of financial stability and improved planning, though challenges such as inconsistent payment systems, limited influence on savings patterns, and continued reliance on borrowing remain evident. Overall, agro-processing units have emerged as a vital driver of rural economic

development, but their long-term effectiveness depends on addressing financial bottlenecks, enhancing institutional support, and ensuring inclusive participation of all categories of farmers.

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Sustainable Agricultural Practices for Viksit Bharat @ 2047

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Abstract:

India's economic path reflects both resilience and dynamism, with 6.5 percent GDP growth in 2024 and 7.4 percent in 2025. These figures, while slightly moderating from an exceptional expansion of 8.2 percent in 2023–24 (Economic Survey 2023-24). The vision of Viksit Bharat @2047 underscores the imperative of structural transformation, particularly through sustainable agricultural development. Agriculture, is a primary sector employing major number of the workforce, must evolve from subsistence oriented practices toward technologically integrated, resource efficient systems. Organic farming, biotechnology and digital agriculture represent critical innovations capable of enhancing productivity while simultaneously conserving natural resources. Equally importance to institutional mechanisms such as agricultural supportive policy frameworks can facilitate extensive implementation of these practices. In a nutshell, sustainable agriculture is not merely a sectoral reform but a cornerstone of India's long term goal to achieve high income status and GDP. The economy is expected to expand over 8-9 times, with estimates GDP between US 30 trillion and US 35 trillion @ 2047.

Introduction:

As India approaches the celebration 100 years of its independence in 2047, the vision of Viksit Bharat @2047 has emerged as a comprehensive framework for national transformation. This vision articulates objectives of placing India as a developed economy, through advancing agro business, social equity, technological innovation, and environmental sustainability.

Agriculture occupies a central and key position within this vision, serving as the backbone of the Indian economy by sustaining livelihoods, ensuring food security, and contributing significantly to national income. The sector's transformation is indispensable for India's developmental path, particularly as the population is projected to exceed 1.6 billion by 2047. Rising demand for food, and raw materials will shift towards sustainable agricultural practices that integrate environmental health, economic viability, and social equity. Such transition is critical not only for addressing challenges posed by climate change and resource constraints but also for ensuring resilience and long term ecological balance.

The adoption of advanced technologies including the Internet of Things (IoT), Artificial Intelligence (AI), robotics, digital agriculture and so on, benefits to enhance productivity, optimize resource utilization, and strengthen sustainability. Equally important is the establishment of robust policy frameworks and strategic planning mechanisms to guide this transformation. Effective governance, public-private partnerships, and targeted investments in research and development is essential to drive innovation and support sustainable practices. Furthermore, agricultural finance, facilitated through financial institutions, microfinance initiatives, and cooperative societies, play a pivotal role in enabling farmers to adopt modern technologies and sustainable methods.

Review of Literature:

1. Jayasingh et al. (2024) situate agriculture within the broader vision of Viksit Bharat @2047, linking sectoral transformation to inclusive growth and rising per capita income. They argue that entrepreneurship, e-commerce, climate-smart practices, and value chain integration are essential for equitable agricultural progress, requiring coordinated efforts from policymakers, businesses, and communities.
2. Ashoor et al. (2024) explore the integration of artificial intelligence (AI) and the Internet of Things (IoT) in modern agriculture, demonstrating how drones, robotics, and smart irrigation systems enable

data-driven precision farming. Their study highlights the necessity of high-speed 5G networks for rural connectivity and examines Smart Decision Support Systems (SDSS) as tools for real-time soil analysis and informed decision making.

3. Sharma et al. (2024) revisit the historical and contemporary relevance of organic farming, underscoring its role in food security, climate resilience, and support for small-scale farmers. They contend that organic agriculture, rooted in traditional practices, can mitigate climate risks and enhance sustainability, provided adequate policy support is in place.
4. Lee et al. (2023) apply the UTAUT model to examine agricultural extension professionals' promotion of precision farming. Their findings reveal that demographic variables such as age and gender do not significantly influence adoption, but professional competence and motivation are critical, suggesting the need for comprehensive training programs.
5. Rimpika et al. (2023) compare precision farming with traditional methods, particularly in fragmented landholdings. They conclude that precision agriculture can optimize resource use and improve productivity, though financial constraints hinder adoption among small scale farmers, who dominate India's agricultural landscape.
6. Manoj Kumar (2023) highlights bio pesticides as sustainable alternatives to synthetic chemicals, focusing on neem-based products and biodiversity driven innovations. The study emphasizes the importance of supportive policy frameworks to accelerate adoption and scale production.
7. Shahane and Shivay (2022) examine soil health management in organic farming, advocating conservation agriculture practices such as crop rotation and minimal soil disturbance. They note that government initiatives like Soil Health Cards promote balanced fertilization but acknowledge challenges related to yield gaps and cost burdens.
8. Smith et al. (2019) trace agricultural biodiversity trends post-Green Revolution, finding that while regional crop diversity declined due to specialization, national diversity increased overall. Their study underscores the importance of balancing specialization with biodiversity to ensure food security.

Although sustainable agriculture has been widely studied, remains gap in the literature concerning its long-term integration within India's national vision of Viksit Bharat @2047. Existing scholarship largely emphasizes development models and ecological practices but does not sufficiently address how these can be aligned with the digital transformation and technological innovations to reshape India.

Objectives of the Study

1. To understand the role of emerging tools in strengthening sustainable practices.
2. To find out the practices for sustainable agriculture development.

Research Methodology

A qualitative research design has been adopted to provide an in-depth understanding of sustainable agricultural development. Scholarly articles accessed through Google Scholar and other academic databases. Secondary data drawn from various reports and publications of organizations such as FAO, ICAR, NITI Aayog.

Significance of the Study

This study holds substantial importance for better agricultural future of India.

1. Food Security: It addresses the need for reliable food systems to support a growing population.
2. Environmental Sustainability: It emphasizes practices that safeguard soil health, biodiversity, and climate resilience.
3. Socio-Economic Equity: It highlights the livelihoods of the more than half of India's population dependent on agriculture
4. Policy Contribution: It provides evidence based insights for policymakers to integrate sustainability with digital innovation.

Indian agricultural sector is currently challenged by climate variability, soil degradation, inadequate irrigation facilities, and excessive reliance on chemical inputs. By identifying pathways to overcome these barriers, agricultural practices becomes the needs of present and future generations, in alignment with the vision of Viksit Bharat @2047.

Sustainable Agriculture Practices leads to Viksit Bharat -

Automation powered by AI is transforming farm operations. Artificial Intelligence (AI) and Machine Learning (ML) are redefining agricultural practices by enabling predictive analytics and automation. AI driven models utilize large datasets. These insights allow farmers to optimize planting schedules, resource allocation, and pest management strategies that will result in reducing risks of crop failure and ultimately improves productivity. Smart machinery, including advanced vehicles and autonomous robots, can perform labor intensive tasks such as planting, irrigation, harvesting, and monitoring. Integrated with IoT and computer vision, systems detect crop maturity, identify diseases, and manage weeds, reducing reliance on manual labor and chemical inputs. For instance, AI enabled drones are increasingly deployed for precision spraying of fertilizers and pesticides, minimizing waste and promoting environmentally sustainable practices. Blockchain technology is emerging as a transformative innovation for ensuring transparency, accountability, and efficiency in agricultural supply chains. By creating a secure and distributed ledger, it enables stakeholders to record and verify data at every stage of production and distribution. Smart contracts facilitated by blockchain further strengthen trust between farmers and buyers by ensuring secure, timely, and equitable transactions. Digital platforms and e-marketplaces powered by blockchain empower small scale farmers to sell directly to consumers, bypassing intermediaries. Additionally, it improves logistics by streamlining data sharing and coordination among stakeholders, thereby reducing inefficiencies and enhancing supply chain resilience.

Biotechnology also provides innovative solutions to address sustainability challenges in agriculture. Techniques such as genetic modification, tissue culture enhance crop resilience and productivity. Considering the environmental pollution, degradation of soil, farmers should try to avoid the use of chemical pesticides and fertilizers as much as possible and make maximum use of organic pesticides and fertilizers. They should use organic fertilizers like compost, manure, green manure, vermin compost, etc. Government should exercise control over the companies producing and supplying chemical fertilizers and pesticides regarding ingredients and prices and should open fertilizers and pesticides shops on a rationing basis with the help of NGOs or any authorized institutes.

Agricultural finance constitutes a critical pillar for enabling farmers to adopt modern technologies and sustainable practices. Affordable and accessible credit is essential for enhancing productivity and resilience in the sector. Innovative financial instruments such as microfinance initiatives and digital lending platforms are mounting to great extent. Financial institutions, including commercial banks, regional rural banks (RRBs), and cooperative banks, provide targeted credit schemes and insurance products that support agricultural investment. Self Help groups (SHGs) and microfinance programs further strengthen rural communities by improving access to financial resources. The Kisan Credit Card (KCC) scheme has been particularly transformative, offering flexible credit to millions of farmers.

FarmDrive in Africa is a strong example of how fintech innovation can directly contribute to sustainability in agriculture. Like this way, by using mobile data and alternative information sources to assess the creditworthiness of smallholder farmers, FarmDrive reduces reliance on traditional collateral and opens access to finance for communities that are often excluded from formal banking. This approach not only empowers farmers economically but also supports sustainable development goals by promoting financial inclusion, reducing poverty and strengthening food security. Through its mobile based platform, farmers can record expenses, revenues, and crop data, which are then analyzed using machine learning to generate reliable credit scores. This data driven model enables financial institutions to confidently lend to farmers, helping them to invest in better seeds, equipment, and climate-resilient practices. In turn, these investments improve productivity aligning with sustainability principles of resilience and resource efficiency.

The realization of Viksit Bharat @2047 depends on the effective integration of advanced technologies with sustainable farming practices. The above mentioned Key components helps to enhance productivity. Alongside these, eco-friendly approaches such as organic farming, Integrated Pest Management (IPM), and crop diversification contribute to ecological preservation. Efficient irrigation systems and rainwater harvesting are vital for sustainable water management, while soil quality improvement through targeted techniques and regular analysis ensures long-term fertility. Policy support and accessible agricultural finance further encourage the adoption of sustainability. Collectively, these practices empower farming communities and strengthen India's agricultural sector in alignment with national development goals.

Conclusion

The vision of Viksit Bharat @2047 places agriculture as a central pillar of India's developmental journey, highlighting sustainability, innovation, and resilience as the foundation of progress. In order to achieve this vision, transition from conventional methods to modern, eco-conscious practices that protect natural resources must need to apply. Approaches such as organic farming, crop diversification, efficient water and pest management, ecofriendly practices helps in achieving sustainable goals.

Effort from various sources is an imperative factor. Government institutions enabling policies, infrastructure, and financial support, while farmers need access to get advanced training and modern tools to adapt in developing situations. This collective approach will not only improve rural livelihoods but also integrate agriculture into broader economic transformation of our country.

By 2047, deliberate investments in human capital, technology, infrastructure, ecofriendly practices and innovations supported by inclusive policies and active collaboration, can transform agriculture into a resilient, globally competitive sector. By aligning agricultural modernization with sustainability, India can ensure inclusive economic growth with the mission of Viksit Bharat @2047.

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A Study of E-Banking Digitalization And Its Role in Viksit Bharat 2047

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Abstract:

Digitalisation of E-banking is vital for converting outdated and traditional banking into quick, transparent, and customer-focused digital services. Digitisation is the process of using technology to transform information into an electronic form. The use of digital technologies to deliver banking services such as online and mobile banking is known as E-Banking digitalization. It is beneficial for customers convenient, and it also saves their time. It is a roadmap for India's financial transformation. The research shows that how digitalization in banking beneficial for us such as convenience, efficiency, accessibility and cost effective. The research also discusses the role of e-banking digitalization in promoting financial inclusion, increasing transparency and supporting economic growth.

Keywords: E-Banking, Digitalization, Viksit Bharat 2047.

Introduction:

Meaning of Digitalisation: Digitalisation means use of technology, electronic devices and the internet to perform tasks online rather than manually or physically. Digitization is the process of using technology to transform information into an electronic form.

E-Banking: Electronic Banking means use of electronic and digital devices to render banking service to their customers without the need to visit physically to bank branch. E-banking it is a system that helps to customer to perform financial transactions and access the banking services with the help of electronic devices such as mobile phone, ATMs, computers and internet without the need to visit to branch physically. The use of digital technologies to deliver banking services such as online and mobile banking is known as "E-Banking digitalisation." These banking services are as follows

1. Online Banking
2. Mobile Banking
3. UPI and Digital Payments
4. Internet Fund Transfer like National Electronic Fund Transfer, Real Time Gross Settlement etc.
5. Digital Wallets and QR based payments

Digitalisation enable to lowers human error and fosters consumer loyalty, it has also made managing enormous sums of cash easier. Customers have also benefited from digitalization since it has made cashless transactions easier. Consumers have no need to carry or store currency and are able to conduct business whenever and wherever they choose. Through interactive and electronic communication channels, digitization facilitates the provision of high-quality services to clients. There is no need for customers to physically visit the bank branch in order to manage their accounts and conduct transactions.

India has experienced a significant change in digital banking over the last ten years, due to government initiatives, technological development and increased use of internet. The development of the UPI by the National Payment corporation of India which help to transform real-time digital transaction digital transactions, it is a one of the important turning points in India's digital banking history. Instant fund transfer has been made possible via UPI, which has contributed to nations for implementation of cashless payments.

Objectives of The Study

- 1) To Study the Concept of E-Banking Digitalisation.
- 2) To Study Importance of E-Banking Digitalisation.
- 3) To Study the Role of E-Banking in Viksit Bharat 2047.

4) Review Of Literature:

- 1) B. Radhika in their research paper they have focused on importance of digitalization to customers, problems for offering services by banks. They also suggested some measures to overcome these problems.
- 2) Gokhale Institute of Politics and Economics (2023) in their study “The Role of Digital Financial Services in Rural Western Maharashtra” they focused on the adoption of digital banking services in Western Maharashtra, it covers regions such as Pune, Satara, Sangli, and Kolhapur. The study finds that UPI payments and mobile banking adoption have increased significantly because of improved smartphone penetration. However, challenges such as network connectivity issues, cyber fraud and lack of awareness among rural areas it limits to full digital financial inclusion. They suggest that there is need to strengthening digital infrastructure, conducting financial literacy programs and improving banking security measures.
- 3) Dr. Pratik Haribhajan Shinde (2025) in their study “Financial Inclusion and Digital Banking: Pathways to Economic Transformation and Inclusive Growth in Viksit Bharat 2047” they focused on study role of financial inclusion in fostering economic growth and reducing inequality in India. The study found that 75% respondents in urban area use digital banking. In rural area this percentage are near about 40%.The researcher also find out some barriers digital illiteracy, cyber fraud and lack of access to smartphone.
- 4) Vishnu Gupta & Princy Singh in their study on “Impact of Digitalisation on Viksit Bharat 2047: A Comparative Analysis” evaluates the critical impact of digitalisation on key sectors economy, social services, governance and sustainability to Viksit Bharat 2047. The study evaluates how digital technologies like AI, Internet of Things and digital public infrastructure boost productivity, promotes innovation, and enhance service delivery in education, healthcare and governance.They also study about opportunities and challenges related with digital transformation.

Methodology:

The qualitative data is used for this study. The secondary method of data collection is used for this study. Secondary data is collected through various websites, research papers and research articles published in journals.

Benefits Of E-Banking Digitalization:

There are various benefits of e-banking digitalisation they are as follows.

- 1) **Convenience and Efficiency:** E-banking digitalisation is very efficient because users may access their accounts at any time for instant operations, like creating accounts using video KYC, setting up auto-debits, or monitoring spending.
- 2) **Availability:** Digital banking guarantees that financial services are accessible at all times, satisfying your demands even beyond regular business hours.
- 3) **Cost Efficiency:** By lowering banks' operating expenses, digital banking enables you to take advantage of lower costs and improved interest rates.
- 4) **Personalized Services:** To provide you with specialized goods and services, banks examine your financial information. Your whole banking experience is improved by this.
- 5) **Paperless Operations & Sustainability:** By significantly reducing the number of paper-based transactions and statements, digital banking helps to save the environment.
- 6) **Direct Access to Financial Products:** Online platforms make it easy to manage investments, apply for loans, and maintain control on spending without need to visit branches.

Role of E-Banking in Viksit Bharat

Digitalisation of E-banking is vital for converting outdated and traditional banking into quick, transparent, and customer-focused digital services. The use of digital technologies to deliver banking

services such as online and mobile banking is known as E-Banking digitalisation. It is beneficial for customers convenient, and it also saves their time.

1. **Universal Financial Inclusion:** After reaching 64.2 in March 2024 and 60.1 in March 2023, the Reserve Bank of India's (RBI) Financial Inclusion Index (FI-Index) increased to 67.0 in March 2025. It means the trend of financial inclusion shows increasing day by day. 55.98 crore people have benefited from the ground-breaking Pradhan Mantri Jan Dhan Yojana. The objective is to attain complete financial inclusion by 2047, enhancing middle- and lower-income groups' access to credit through digital banking initiatives, mobile payments, and the Jan Dhan Yojana.
2. **Cashless Economy:** In 2024, an unbelievable 99.7% of all payments were done digitally, marking a significant turning point in our country's technological development, according to the most recent Reserve Bank of India data. The fact that 97.5% of transactions were completed digitally even while considering transaction value indicates that Indians are gradually eschewing cash and checks.
3. **Transparency and Accountability:** Digital banking helps in reducing corruption and leakage due to digital records. Digital banking or digital records helps in real-time tracking the government subsidies. It guarantees that the money are transferred directly and openly to the right beneficiary.
4. **Simplicity in conducting business:** E-banking digitalization enables to faster transactions and digital documentation. It helps individual or business organizations to apply for loan digitally without visiting a bank branch. It has become very easy for banks as well as to make online payments and to carry out legal requirements and compliance-related tasks.
5. **Support Economic Growth:** Because of financial inclusion more people can participate in the economy. It leads to overall productivity and income level. E-banking digitalisation helps to expand small business activity, job creation and innovation. As per the third edition of MSME Digital Index Report revealed that over 73% of micro, small and medium enterprises in rural areas have reported business growth due to adoption of digital things.
6. **Improving Governance and Security:** In order to promote a digital-first economy, legislative frameworks are being reinforced to guarantee fraud prevention and foster confidence in digital platforms. By protecting personal information the Digital Personal Data Protection Act 2023 establishes a safe environment for online transactions.
7. **Totally Paperless and Automated Banking:** The banking industry's future contains switching to completely digital operations, the use of block-chain technology for safe, transparent records, and AI-driven workflows for immediate loan approvals.
8. **Support to Government Vision:** Finance Minister Sitharaman says that banks will play important role in making the Viksit Bharat.

Future Vision For 2047:

- 1) **100% Paperless Banking:** Physical documents must be replaced by entirely digital financial processes, both internal and external.
- 2) **AI-Driven Workflow Automation:** To eliminate out paperwork, simplify loan approvals, compliance, and customer on boarding.
- 3) **Block chain-Based Digital Records:** Distributed Ledger Technology (DLT) is used in block chain-based digital records to provide transparent, impenetrable record-keeping.
- 4) **E-KYC & Digital Signatures:** extending digital documentation for immediate approvals and e-KYC based on Aadhaar.
- 5) **Sustainable IT Infrastructure:** switching to green data centers and cloud-based banking that uses less energy.
- 6) **Carbon-Neutral Banking Operations:** utilizing eco-friendly banking methods and sustainable financing to achieve net-zero emissions.

Conclusion:

As India moves closer to achieving Viksit Bharat 2047, digital banking and financial Inclusion plays important role as a pillars of Viksit Bharat 2047. The foundation of Viksit Bharat is the digitalization of e-banking, which promotes global competitiveness, inclusive growth and economic efficiency. India can create a safe and sustainable digital banking environment that helps the country reach its objective of becoming a developed one with constant innovation, strong digital infrastructure, and financial literacy.

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A Study on the Role of SHGs in Skill Development and Employment Generation.**Mr. Shrikant Anil Lohar**

(Assistant Professor)

Dhananjayrao Gadgil College of Commerce, Satara.

Email ID-loharshrikant15@gmail.com**Abstract-**

Self-Help Groups are really good for women to become powerful especially when it comes to learning skills and getting jobs. This study looks at how Self-Help Groups help women learn skills and make money in cities and villages. We got information from people and other sources that shows Self-Help Groups really help women get better at things start their businesses and get jobs. The study also found some problems, like not having money and not knowing how to use computers that make it hard for Self-Help Groups to work well. Self-Help Groups are very important for women to become powerful and independent.

Key Words- *Self-Help Groups (SHGs), Skill Development, Employment Generation, Women Empowerment, Microfinance, Vocational Training.*

Introduction-

Self-Help Groups are like teams of people mostly women, who get together to make their lives better. These Self-Help Groups do a lot more than just help people with money problems. They also teach people things and help them learn skills so they can get a job or start their own business. In India the government supports Self-Help Groups through programs like Deendayal Antyodaya Yojana National Rural Livelihoods Mission. This is done to help people find work and have a life. This study is about how Self-Help Groups help people learn skills and get jobs, in cities and rural areas.

**Importance of this study-**

Self-Help Groups are really important because they help women get jobs. They give women a chance to do things that make money. These groups teach women skills, which makes them feel more confident and able to do more things to earn money. When these programs work well they show people who make policies and NGOs what works and what does not so they can make plans to help women learn new skills. Self-Help Groups help everyone have a chance to grow and they help women be independent, with money so women can have better lives and be respected more in their communities. Self-Help Groups make a difference in the lives of women.

Objectives of the Study-

1. To study the skill development initiatives provided by SHGs.
2. To assess employment opportunities created through SHG activities.

Research Methodology-

This study is Descriptive and Analytical Research this study is mainly based on primary and secondary data collected from Ministry of Rural Development, 2024. NABARD SHG Annual Report, 2024. National Digital Literacy Mission Report, 2024. NRLM & PMKVY Reports, 2024. NABARD SHG Impact Study, 2024. Research journals books, articles and journals.

1. To study the skill development initiatives provided by SHG.

Self-Help Groups are really important for women. They help women learn things and get better at doing stuff. One of the things they do is teach women new skills. Women can learn how to sew make handicrafts do embroidery make food and take care of their beauty.

Self-Help Groups do this by having training programs. These programs teach women things that they can use to make money. Women can start their small businesses or work from home. This makes women more able to take care of themselves.

Self-Help Groups and their vocational training programs are very helpful to women. They help women learn skills, like tailoring and food processing. Women can use these skills to earn money and be more independent.

Entrepreneurship Development Programs are really important. These programs teach women how to plan a business do marketing keep track of money and manage businesses. The women who are part of Self Help Groups learn a lot from Entrepreneurship Development Programs and become confident that they can run their businesses. They get the knowledge they need to make their businesses successful.

Self Help Groups also focus on teaching women about money and how to use it wisely. They learn how to save money manage the money they borrow apply for loans when they need it and make a budget that works for them. This way women who are part of Self Help Groups can take charge of their money and get help, from the government or banks when they want to start their own business.

Technology is getting better and better. So it is really important for people to know how to use it. The women who are part of the Self Help Groups or SHG members, for short are learning how to use smartphones. They are also learning about internet banking and how to make payments. Some of them are even learning about marketing. This means the women can sell their things to people and make their businesses better. The SHG members can use literacy and technology training to help them with this.

So Self Help Groups organize workshops to help women get better at what they do. These are, like classes where women can learn things. For example they can learn how to make handicrafts in a way or how to farm using new methods. This helps the women at Self Help Groups stay ahead and do their work efficiently. Self Help Groups are really helpful for women to improve their skills.

The government is helping with things, like Deendayal Antyodaya Yojana – National Rural Livelihoods Mission and Pradhan Mantri Kaushal Vikas Yojana.

These Deendayal Antyodaya Yojana – National Rural Livelihoods Mission and Pradhan Mantri Kaushal Vikas Yojana programs are really useful because they give women the training they need and they also get to use the tools and get some money to help them. This makes it easier for women to do things that will give them an income.

The skill development initiatives that Self Help Groups provide really make a difference. These initiatives help women get jobs and earn money. This means women can take care of themselves financially and they become stronger, in their communities. The skill development initiatives provided by Self Help Groups are very important for women to gain employment and increase their income. Women are able to become financially independent because of the skill development initiatives provided by Self Help Groups. This is how the skill development initiatives provided by Self Help Groups help women achieve empowerment.

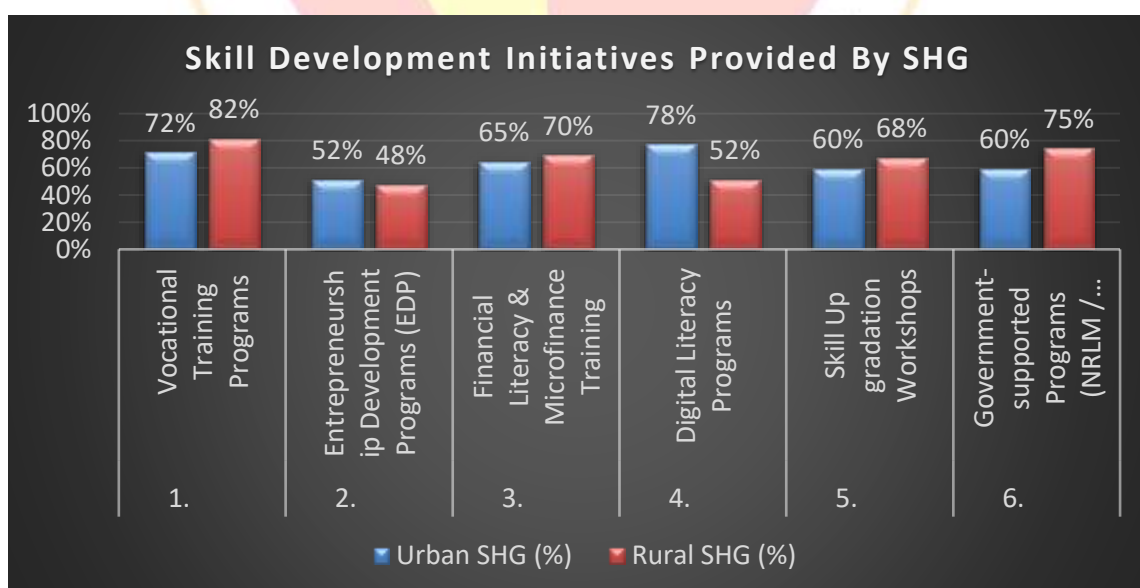
Skill Development Initiatives Provided By SHG

Sr.No	Initiative	Urban SHG (%)	Rural SHG (%)
1.	Vocational Training Programs	72%	82%
2.	Entrepreneurship Development Programs (EDP)	52%	48%
3.	Financial Literacy & Microfinance Training	65%	70%
4.	Digital Literacy Programs	78%	52%
5.	Skill Up gradation Workshops	60%	68%
6.	Government-supported Programs (NRLM / PMKVY)	60%	75%

Source- NABARD SHG Survey, 2024. Ministry of Rural Development, 2024. NABARD SHG Annual Report, 2024. National Digital Literacy Mission Report, 2024. NRLM & PMKVY Reports, 2024. NABARD SHG Impact Study, 2024.

Explanation-

The table shows that Rural SHGs have a lot more people taking part in Vocational Training with 82 percent of them participating, compared to SHGs which have 72 percent. This is probably because the government is doing a job of reaching out to people in rural areas. When it comes to Entrepreneurship Development Programs Urban SHGs are doing a bit better with 52 percent of them taking part compared to SHGs which have only 8 percent. This makes sense because cities have opportunities for people to buy and sell things. Rural SHGs are also doing a bit better when it comes to Financial Literacy and Microfinance with 70 percent of them getting training compared to Urban SHGs which have 65 percent. This shows that people, in villages are relying more on saving money and using microcredit schemes. Digital Literacy is really important for Urban Self Help Groups. They are doing a job with digital training. In fact they are ahead of the others. 52 Percent of them are getting trained compared to just 8 percent of the others. This is because they have access to smartphones and the internet. They also know how to use business tools. When it comes to Skill Upgradation Workshops, Rural Self Help Groups are more interested. 68 Percent of them participate in these workshops to upgrade their existing skills. This is more than the Urban Self Help Groups, where 60 percent participate. The Rural Self Help Groups are getting support in local trades like handicrafts and agriculture. The Government-supported Programs are also helping the Rural Self Help Groups. 75 Percent of them are benefitting from these programs like NRLM and PMKVY.



Explanation-

The bar graph shows how many Urban and Rural SHGs are taking part in six skill development initiatives. The thing that most Urban and Rural SHGs are doing is Vocational Training Programs. A lot of Urban SHGs are doing this. 82 Percent and a lot of SHGs are doing this too. 72 Percent. Rural SHGs are doing better in a things. They are doing better in Financial Literacy and Microfinance. 70 Percent of SHGs are doing this but only 65 percent of Urban SHGs are doing it. Rural SHGs are also doing better in Digital Literacy. 78 Percent of them are doing this. Only 52 percent of Urban SHGs are doing it. Rural SHGs are doing better in Skill Upgradation Workshops too. 75 Percent of them are doing this but only 68 percent of Urban SHGs are doing it. Urban SHGs are doing a little better in one thing. Entrepreneurship Development Programs. 52 Percent of Urban SHGs are doing this. Only 48 percent of Rural SHGs are doing it. One thing that Urban and Rural SHGs are doing equally is Government-supported Programs, like NRLM and PMKVY. 60 Percent of both Urban and Rural SHGs are doing this.

2. To assess employment opportunities created through SHG activities.

Self-Help Groups are really helpful for women to get jobs. They do this in areas and in cities too. Women join classes to learn skills and start their own businesses. This way women can earn money. In the year 2024 a lot of women who joined Self-Help Groups got jobs. Earned more money. 63 Percent of women in cities who joined Self-Help Groups got jobs or earned more money.. About 68 percent of women, in rural areas who joined Self-Help Groups also got jobs or earned more money after they joined Self-Help Groups.

Self Help Groups also help women start businesses like tailoring and handicrafts. They also help with food processing and beauty services and small shops. Women get money from government plans like Deendayal Antyodaya Yojana – National Rural Livelihoods Mission and Pradhan Mantri Mudra Yojana. This money helps women start their businesses and make them bigger. Self Help Groups are very helpful, for women who want to start their businesses.

Self Help Groups do a lot of things for people. They help people get jobs and make money at home. This means women are able to take care of themselves and they feel more powerful, in their communities.

In the country Self Help Groups usually focus on farming and local businesses.. In the city Self Help Groups like to try all sorts of different businesses and use computers to find new opportunities.

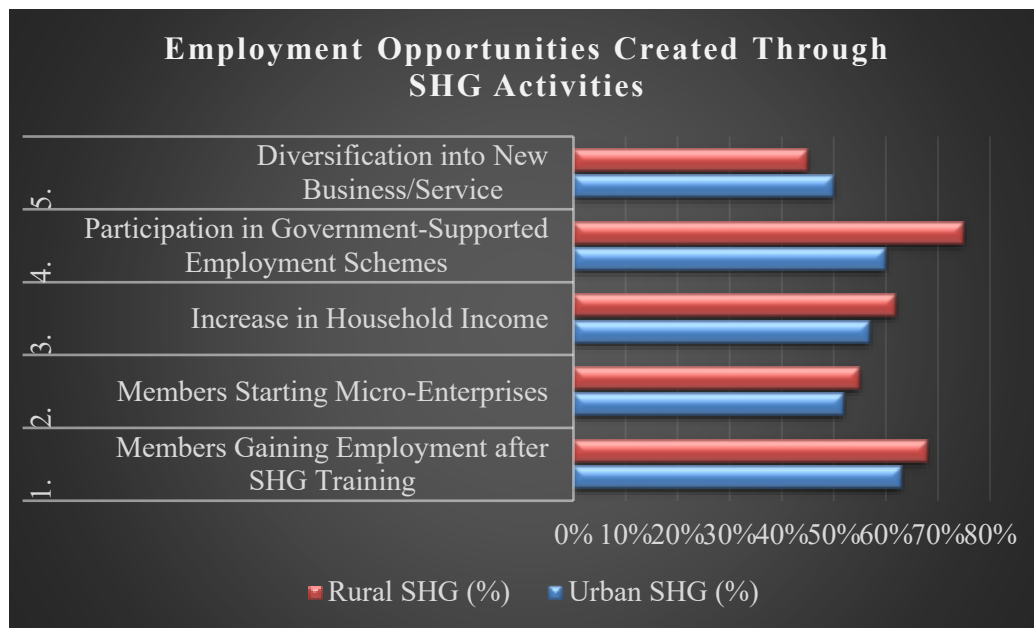
Employment Opportunities Created Through SHG Activities.

Sr.No	Employment Indicator	Urban SHG (%)	Rural SHG (%)
1.	Members Gaining Employment after SHG Training	63%	68%
2.	Members Starting Micro-Enterprises	52%	55%
3.	Increase in Household Income	57%	62%
4.	Participation in Government-Supported Employment Schemes	60%	75%
5.	Diversification into New Business/Service	50%	45%

Source- NABARD SHG Survey, 2024. Ministry of Rural Development, 2024. NABARD SHG Annual Report, 2024. National Digital Literacy Mission Report, 2024. NRLM & PMKVY Reports, 2024. NABARD SHG Impact Study, 2024.

Explanation-

The table shows that Rural Self Help Groups are really good at creating jobs helping people make money at home and getting people to take part in government programs. This is mostly because the government is helping them and the community is supporting them. On the hand Urban Self Help Groups are good at trying new businesses and services. They use computers and the internet to find ways to make money. Overall Self Help Groups do a job of giving people jobs and helping them become financially independent. They also help women become more powerful. Self Help Groups are very important, for women empowerment and financial independence.



Explanation-

The bar graph tells us about the jobs that people get from the things that Self Help Groups do in the countryside and in cities. It looks like the groups in the countryside are doing a job in every area. The thing that helps the most is the money people have at home. This is true for about 75 percent of the people in the countryside and 65 percent of the people in cities who are part of Self Help Groups. A lot of people in Self Help Groups also start businesses or offer new services and this is something that about 50 percent of the people in the countryside and 40 percent of the people in cities are doing. Then there are the government programs that help people and these programs are used by 45 percent of the people in the countryside and 35 percent of the people, in cities who are part of Self Help Groups. Not many people started their small businesses. 35 Percent of people in the country and 25 percent of people in the city did this. Some people got jobs directly. This happened to 20 percent of people in the country and 15 percent of people, in the city. These things did not happen often to micro-enterprises. Micro-enterprises had these outcomes the least.

Findings-

1. SHGs play a significant role in skill enhancement for women.
2. Employment opportunities increase after participation in SHG skill programs.
3. Rural SHGs benefit more from government schemes, whereas urban SHGs leverage digital skills.
4. Financial constraints and lack of advanced training remain challenges.
5. SHGs help women achieve economic independence and social empowerment.

Conclusion-

Self-Help Groups are really important for helping women learn skills and get jobs. The Self-Help Groups in areas do very well when they get help from the government and the community. On the hand the Self-Help Groups in cities are very good, at using digital skills. To really make Self-Help Groups work well we need to focus on teaching women the skills they need giving them money to help and teaching them about computers and the internet. This will help the Self-Help Groups make a difference.

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The Effectiveness of Corporate Social Responsibility Initiatives**Miss Gouri Jagannath Sakate**

Kisan veer Mahavidyalaya , wai

Abstract

Corporate Social Responsibility (CSR) has emerged as an important strategic approach through which organizations integrate social, environmental, and ethical concerns into their business operations. This study examines the effectiveness of CSR initiatives in enhancing organizational performance and creating positive social outcomes. The research evaluates how CSR activities influence stakeholder trust, corporate reputation, community development, and sustainable business growth. Evidence from previous studies indicates that well-planned CSR programs improve brand image, strengthen relationships with stakeholders, and contribute to long-term profitability and organizational effectiveness. However, the success of CSR initiatives depends on transparency, stakeholder participation, and alignment between corporate objectives and societal needs. This study examines the effectiveness of Corporate Social Responsibility (CSR) initiatives in enhancing organizational performance, stakeholder relationships, and societal outcomes.

1. Introduction

CSR concept has been developing since early 1970s, yet a universally accepted definition remains elusive. Numerous codes, conventions, principles, and standards have emerged, reflecting the diverse CSR practices across different economies. In 1991, Indian society was not yet significantly liberalized or globalized. However, the economic reforms introduced subsequently led to substantial benefits, including enhanced access to diverse information and a plethora of perspectives. CSR in India was formally introduced through Companies Act, 2013. Before this, there were no mandatory provisions that required companies to contribute to social causes, though many companies engaged in philanthropic activities voluntarily

Corporate Social Responsibility refers to business practices that promote social welfare beyond profit-making activities. Modern organizations are expected to operate ethically while contributing to environmental protection and community development.

CSR initiatives include:

- Education programs
- Healthcare support
- Environmental sustainability
- Rural development
- Employee welfare programs

Legal framework for CSR: Section 135 of the Companies Act, 2013: Companies “that fall under certain limits are required to establish CSR committee and allocate specific portion of their earnings to CSR initiatives.” Primary provisions of Section 135 are as follows:

Applicability: CSR provisions Applies to companies fulfilling at least one of following thresholds in preceding financial year(FY):

- Net worth of ₹500crore or more
- Turnover of ₹1,000crore or more.
- Net profit of ₹5crore or more.”

CSR Expenditure: These companies are “required to allocate at least 2% of their average net profits over past 3 years towards CSR” activities

CSR Committee: Every eligible company covered under Section 135(1) must form a CSR committee consisting of following members

1. Minimum of 3 directors
2. At least 1 Independent Director

This committee establishes and recommends CSR policies that represent company's beliefs and goals.

Role of CSR Committee: To ensure that company's CSR efforts are under its social ethics and business goals, CSR committee is essential.

CSR Activities: The CSR policy must define activities “under Schedule VII of the Companies Act” “as follows: Rural development projects. Contribution to armed forces veterans, among others. Environmental sustainability. Promoting education. Promoting gender equality and empowering women & children. Reducing” inequalities. Remove poverty, & malnutrition. Providing clean water and sanitation

Reporting and Disclosure: Relevant Companies must provide details regarding their CSR initiatives in their ROC annual reports. average CSR obligation of Rs. 10 crore or more over previous 3 FY. Non-compliance with spending or reporting requirements penalties (Section 135(7)) attracts Rules and Guidelines by Ministry of Corporate Affairs (MCA): MCA has issued detailed rules and guidelines for CSR under “Companies (Corporate Social Responsibility Policy) Rules, 2014”. These rules underlie governance of CSR activities and direct companies in their CSR obligations, define their CSR policies, and monitor their CSR spending. Schedule VII of the Companies Act, 2013: “Companies Act Schedule VII” describes a wide range of activities under CSR. This includes: Promoting healthcare and education. Contribution If company doesn't spend required amount on CSR, it has to explain. Such Non-compliance leads to additional fees & penalties. Independent impact evaluations for CSR initiatives over Rs. 1 crore must be conducted by companies having an average CSR obligation of Rs. 10 crore or more over previous 3 FY. Non-compliance with spending or reporting requirements penalties (Section 135(7)) attracts penalties (Section 135(7)).

Non-Spending of CSR Funds: A corporation must explain non-compliance in its Board report if it does not spend required amount on CSR activities. Board must endorse this explanation, that could include emphasis in company's annual report. Within 6 months, all unused CSR funds must be moved to a designated social purpose fund and stored separately. [or utilised, properly disclosed, in ongoing disclosures].

2.Objectives of the Study

1. To understand the concept of CSR initiatives.
2. To examine the effectiveness of CSR programs.
3. To analyse the impact of CSR on organizational performance.
4. To study CSR benefits for society and stakeholders.
5. To identify challenges in CSR implementation.

3.Hypotheses of the Study

H₀ (Null Hypothesis): Corporate Social Responsibility initiatives have no significant impact on organizational performance and stakeholder satisfaction.

H₁ : Corporate Social Responsibility initiatives have a significant positive impact on organizational performance and stakeholder satisfaction.

4.Need for the Study

- Growing importance of ethical business practices
- Mandatory CSR regulations in many countries including India
- Need to evaluate social and business impact of CSR

5.Limitations of the Study

- Based mainly on secondary data
- Limited industry-specific comparison
- Social impact measurement challenges

6.Review of Literature

- Research indicates CSR strengthens corporate reputation and stakeholder engagement.
- Studies show CSR improves organizational effectiveness and public image.
- CSR reporting positively influences firm performance and long-term value creation.
- CSR initiatives can increase profit efficiency and competitive Advantage.

7. Research Methodology

Research Design : Descriptive research design.

Type of Data

Secondary data: Research journals, Books, CSR reports, Published articles

8. Analysis of the Data Collection

The provisions of CSR in India are part of “Section 135 of the Companies Act, 2013,” which have substantially influenced the corporate contribution to social uplift by forcing any eligible company to devote a portion of its profits to social, environmental, and other related causes. This legal requirement has not only entrenched CSR but has also provoked realistic undertakings that seek to respond to many of the country’s challenges. CSR goes hand in hand with an understanding that when organizations practice CSR, they help improve the conditions of communities fortunate enough to be associated with the relevant businesses while at the same time fostering an environment that is suitable for sustained economic development. A reflection of CSR shows that it goes ant to ant for society because it enhances the standard of living and tackles and solves social issues to boost and enhance the standard of living and enhance growth. All these impacts are important, particularly in a country like India, which is multicultural and has a large population, undergoing socio-economic transformation, and therefore any impacts have to be felt by all the members of the society. Another important goal of CSR is to increase the multiplier impact of developmental benefits on those who are deprived of accessing them, such as women, SCs, STs, and the poor That is why the CSR initiatives can be regarded as decreasing socio-economic Inequalities . CSR programs that tackle the management of water conservation, and wildlife protection are some of the acts that companies undertake as their corporate social responsibilities. Green innovations are important to CSR as they involve creating new technologies and businesses that create little harm to the environment. Through product innovation and research, those with capital put their money into investing in companies dealing with green products, renewable energy systems, and production with reduced impacts on the environment. CSR has social, economic, and environmental effects on society since it also embraces sustainable development goals There are conditions under which businesses profit from CSR by making the world a better place in terms of economic growth, social improvement, and a sustainable environment. Finally, a clear example of good CSR work done in India is the work of the Tata Group and specifically Tata Steel Rural Development Society. all of which are oriented towards healthcare, education, skill development, and the creation of livelihoods for the needy people .CSR remains a success story in the support of societal welfare and development in India, but the extent of accomplishments of the policy largely hinges on the extent of practice and endeavour of organizations to practice more than legal compliance to ethical standards

9. Findings

1. It found a Firms with higher CSR earn long term profitability
2. Research shows firms build brand and reputation and consumer trust.
3. Employee more attract towards firms who have high CSR .
4. CSR commitment increases employee satisfaction

10. Conclusion

CSR helps to businesses for sustainable development And environmental sustainability Secondary data supports that well-executed CSR initiatives positively influence financial performance, stakeholder trust, and social outcomes.

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Empowering MSMEs through Digital Marketing for Viksit Bharat 2047**Miss Rekha Hanmant Bhosale**

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Email: rekhabhosale29shri@gmail.com**Abstract:**

Micro, Small and Medium Enterprises (MSMEs) play a vital role in India's economic development by contributing significantly to employment generation, GDP, exports, and regional balance. As India envisions becoming a developed nation under the mission of Viksit Bharat 2047, digital transformation of MSMEs has become essential. Digital marketing provides cost-effective tools for brand building, customer engagement, global outreach, and competitive positioning. This paper examines the role of digital marketing in strengthening MSMEs, highlights challenges in digital adoption, and suggests strategic measures to empower the sector for sustainable and inclusive growth.

The paper concludes that integrating digital marketing strategies with national development policies is essential for accelerating MSME growth and achieving the broader objectives of productivity, innovation, employment generation, and global competitiveness envisioned under Viksit Bharat 2047. By leveraging digital technologies effectively, MSMEs can become key drivers of India's transformation into a digitally empowered and economically resilient developed nation by 2047.

Keywords: MSMEs, Digital Marketing, Viksit Bharat 2047, Digital Transformation, Economic Growth

1. Introduction

The MSME sector is often referred to as the backbone of the Indian economy. With millions of enterprises operating across manufacturing, services, and trade, MSMEs contribute significantly to industrial output and employment. In the context of Viksit Bharat 2047, the modernization and digital empowerment of MSMEs are critical for enhancing productivity, innovation, and global competitiveness.

Digital marketing has emerged as a transformative force enabling businesses to reach wider markets at lower costs compared to traditional marketing methods. The integration of social media platforms, search engines, e-commerce marketplaces, and data analytics tools has created unprecedented growth opportunities for small enterprises.

The Government of India's flagship initiative, Viksit Bharat 2047, emphasizes economic resilience, technological advancement, global competitiveness, and inclusive growth. Within this framework, digital transformation is recognized as a key enabler of productivity enhancement and market expansion. Complementing this vision, the Digital India programme has accelerated digital infrastructure development, improved internet penetration, expanded digital payment ecosystems, and promoted e-governance reforms. These initiatives collectively create a conducive environment for MSMEs to integrate digital tools into their operations.

Digital marketing, in particular, has emerged as a transformative mechanism for MSMEs to overcome traditional market barriers such as limited capital, restricted geographical reach, and high advertising costs. Through social media platforms, search engine optimization (SEO), content marketing, email campaigns, and e-commerce integration, MSMEs can access broader customer bases, enhance brand visibility, and compete effectively with larger enterprises. Digital marketing not only reduces transaction and promotional costs but also enables data-driven decision-making, customer engagement, and personalized communication strategies.

In India, the increasing adoption of smartphones, affordable internet services, and digital payment systems such as Unified Payments Interface (UPI) has further strengthened the digital ecosystem. These developments provide MSMEs with unprecedented opportunities to participate in national and global value

chains. However, despite these advancements, challenges such as digital literacy gaps, cybersecurity concerns, inadequate technological infrastructure in rural areas, and limited strategic awareness continue to hinder widespread digital marketing adoption among MSMEs.

This research paper seeks to examine the role of digital marketing in empowering MSMEs within the framework of Viksit Bharat 2047. It explores the opportunities, challenges, policy interventions, and strategic pathways necessary to ensure that MSMEs effectively leverage digital marketing to contribute meaningfully to India's journey toward becoming a developed and digitally empowered nation by 2047.

2. Objectives of the Study

1. To examine the importance of MSMEs in India's economic development.
2. To analyse the role of digital marketing in MSME growth.
3. To identify challenges faced by MSMEs in adopting digital marketing.

3. Research Methodology

This study adopts a descriptive and analytical research design based entirely on secondary data. The objective is to examine how digital marketing contributes to MSME empowerment and how this aligns with India's long-term development vision under Viksit Bharat 2047.

A secondary data approach is appropriate because the study focuses on policy frameworks, national trends, sectoral performance indicators, and previously conducted empirical research related to MSMEs and digital transformation.

4. Data Collections:

The secondary method of data collection is used for this study. Secondary data is collected through Government reports and policy documents related to Digital India, Ministry of MSME publications and annual reports, Research articles, journals, and conference papers RBI, NITI Aayog, and industry association reports, Data on digital transactions via Unified Payments Interface (UPI) as indicators of digital ecosystem growth.

5. Literature Review

Vidya Raisagar (2024) studied the role of e-commerce, its current trends, opportunities available, and challenges faced by digital commerce nowadays. **Ch. Nagamalleswari(2014)** examines to understand the strategic alignment between Viksit Bharat 2047 objectives and MSME sustainability imperatives, and studied the current status of sustainability adoption among Indian MSMEs.

Existing studies highlight that digital adoption improves market access, operational efficiency, and customer relationship management. Research indicates that MSMEs using digital platforms experience higher revenue growth and improved brand recognition. However, lack of digital literacy, financial constraints, and inadequate infrastructure remain key barriers.

Government initiatives such as Digital India, make in India, and Startup India have encouraged digital inclusion and entrepreneurship development.

6. Concept

MSME stands for Micro, Small, and Medium Enterprises. In India, it is a formal classification of businesses based on their investment in plant, machinery or equipment and their annual turnover, as defined under the Micro, Small and Medium Enterprises Development (MSMED) Act, 2006.

The objective of this classification is to provide targeted policy support, regulation, and incentives to smaller businesses so that they can grow in a structured and sustainable manner.

7. Role of Digital Marketing in Empowering MSMEs

4.1 Market Expansion

The Digital platforms enable MSMEs to access national and international markets through e-commerce and social media.

4.2 Cost-Effective Promotion

To compared to traditional advertising, digital marketing offers affordable tools such as email marketing, SEO, and content marketing.

4.3 Customer Engagement

The interactive platforms allow real-time communication, personalized services, and improved customer satisfaction.

4.4 Data-Driven Decision Making

Analytics tools help businesses understand consumer behavior and optimize marketing strategies.

4.5 Global Branding

In today's interconnected world, branding and marketing have become indispensable for businesses to thrive, especially for Micro, Small, and Medium Enterprises (MSMEs), Farmer Producer Organizations (FPOs), Off Farm Producer Organizations (OFPOs), and Self-Help Groups (SHGs). Digital presence enhances brand visibility and export opportunities.

8. Challenges in Digital Marketing in MSMEs

1. Lack of digital literacy and technical skills
2. Limited financial resources
3. Poor internet connectivity in rural areas
4. Cybersecurity concerns
5. Resistance to technological change

9. Significance of the Study

Empowering MSMEs through digital marketing will lead to inclusive growth, employment generation, rural development, export promotion, and economic resilience. This transformation aligns directly with the broader national vision of Viksit Bharat 2047.

10. Findings:

The findings suggest that digital marketing significantly enhances MSME visibility, reduces promotional costs, facilitates access to national and global markets, and improves customer relationship management. However, challenges such as digital literacy gaps, infrastructural constraints, cybersecurity risks, and limited strategic awareness continue to hinder widespread and effective adoption. The study highlights the need for targeted policy interventions, digital skill development, and infrastructure expansion to ensure inclusive and sustainable digital empowerment of MSMEs.

11. Conclusion:

The journey toward Viksit Bharat 2047 requires a digitally empowered MSME sector capable of competing globally. Digital marketing serves as a catalyst for innovation, efficiency, and market expansion. By addressing adoption challenges and strengthening institutional support, India can unlock the full potential of MSMEs and accelerate sustainable economic development.

12. Suggestions:

1. To Conduct digital literacy and skill development programs.
2. To Provide financial incentives and subsidies for digital adoption.
3. To Strengthen digital infrastructure in rural and semi-urban areas.
4. To Promote public-private partnerships for training and mentorship.
5. To Encourage integration of AI, automation, and data analytics tools.
6. To Recommend national digital marketing missions for MSMEs.
7. To Align MSME digital growth with Sustainable Development Goals (SDGs).
8. Explore low-cost, high-impact digital tools suitable for rural and semi-urban enterprises.

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**Digital Payments as the Backbone of E- Commerce and E-Banking in
Viksit Bharat with Special Reference to Jaysingpur City****Dr. (Mrs.) Snehal Shital Chougule**Assistant Professor
Jaysingpur College, Jaysingpur**Abstract**

Digital payment systems have emerged as a transformative force in India's financial and commercial environment. This study examines how digital payments function as a structural backbone for the expansion of e-commerce and e-banking, with special reference to Jaysingpur City under the broader vision of Viksit Bharat. The research is based on primary data collected from local users and supported by official reports. The findings indicate that digital payment platforms, particularly UPI, are widely used for online purchases, fund transfers, and routine banking activities. Convenience, speed, and ease of access are the major factors encouraging adoption. The study also observes that digital payments promote financial inclusion by connecting small businesses and first-time users to formal banking channels. However, issues such as cyber security concerns and digital literacy gaps remain challenges. Strengthening infrastructure and awareness can enhance the sustainability of digital transactions.

Keywords - Digital Payments, E-Commerce, E-Banking, Viksit Bharat, UPI, Financial Inclusion, Digital Economy, Consumer Behaviour, Jaysingpur City.

1. Introduction

The concept of *Viksit Bharat* (Developed India) highlights economic growth driven by digital infrastructure, innovation, and inclusive development. In this context, digital payment systems have become a crucial foundation for the expansion of e-commerce and e-banking in India. The shift from cash-based transactions to digital modes has transformed consumer behaviour, business operations, and banking practices. Digital payments enable faster, safer, and more transparent transactions, thereby strengthening trust in online commercial and banking activities. As India progresses towards becoming a digitally empowered economy, digital payments act as a connecting link that integrates e-commerce platforms with e-banking services and supports sustainable economic development.

2. Objectives of the Study

The present study is undertaken with the following objectives:

1. To examine the role of digital payments in the growth of E-Commerce and E-Banking in India.
2. To analyse the adoption of digital payment modes among consumers and businesses.
3. To study the contribution of digital payments towards financial inclusion in the vision of Viksit Bharat.
4. To identify key challenges associated with digital payment systems.

3. Scope of the Study

The scope of the study is limited to digital payment systems used in e-commerce and e-banking within the Indian economy. The study focuses on commonly used digital payment modes such as UPI, debit cards, credit cards, mobile wallets, and internet banking. The geographical scope is restricted to India, with emphasis on both urban and semi-urban users. The study covers a recent period to reflect the current trends in digital transactions relevant to the Viksit Bharat initiative.

4. Research Methodology of the Study

This section explains the systematic approach adopted to collect, analyse, and interpret data for the study titled “**Digital Payments as the Backbone of E-Commerce and E-Banking in Viksit Bharat with Special Reference to Jaysingpur City.**”

4.1 Research Design

The study follows a **descriptive research design**, which aims to describe the current status of digital payment usage in the context of e-commerce and e-banking among residents of Jaysingpur City. This design is appropriate because the research seeks to measure patterns, frequency, and perceptions without manipulating any variables.

4.2 Universe of the Study

The **universe of the study** comprises all adults (18 years and above) residing in **Jaysingpur City**, Maharashtra. The city is represented by diverse socioeconomic groups including students, salaried professionals, small business owners, shopkeepers, and homemakers—all of whom use digital financial services to varying degrees.

4.3 Sample Size and Sampling Techniques

- **Sample Size:** A total of **100 respondents** were selected to ensure adequate representation of different age groups, genders, occupations, and levels of digital payment usage.
- **Sampling Technique:** A **stratified random sampling** technique was used. Jaysingpur City was divided into strata based on major localities such as Railway Station Road and Galli Numbers (Galli No. 1 to 18), Herwade Colony, Kadage Mala, Magdum Housing Society, Deep Nagar, Shahunagar, etc. From each stratum, individuals were chosen randomly to participate in the survey to reduce sampling bias.

4.4 Sources of Data

A. Primary Data

Primary data were collected directly from respondents using a structured questionnaire. This questionnaire included both open-ended and closed-ended questions designed to capture:

B. Secondary Data

Secondary data were obtained from credible sources including: Reports from Reserve Bank of India (RBI), NPCI (National Payments Corporation of India) transaction statistics, Government publications on Digital India and financial inclusion, Research articles from academic journals and online databases.

5. Data Analysis and Presentation

Collected data were organised in the meaningful tables and analysed with the help of the tools such as percentage analysis and descriptive interpretation.

5.1 Usage of Digital Payment Modes

Table 1: Usage of Digital Payment Modes among Respondents

Sr.	Digital Payment Mode	Number of Respondents	Percentage
1	UPI	55	55%
2	Debit Cards	20	20%
3	Credit Cards	10	10%
4	Mobile Wallets	10	10%
5	Internet Banking	5	5%
	Total	100	100%

Source: Primary Data

The data in Table 1 shows the distribution of respondents based on the digital payment modes they commonly use. The data clearly indicates that UPI is the most dominant mode, used by 55% of respondents. This reflects the widespread acceptance of UPI due to its simplicity, instant transaction facility, and wide

merchant acceptance. Debit cards account for 20% usage, indicating that traditional digital banking instruments still hold relevance, especially for higher-value transactions.

Credit cards and mobile wallets are used by 10% of respondents each, suggesting moderate adoption influenced by factors such as credit availability and promotional offers. Internet banking shows the lowest usage at 5%, which may be due to its comparatively complex process and limited suitability for quick transactions. Overall, the table highlights that UPI has become the backbone of digital payments, directly supporting the growth of e-commerce and e-banking in India.

5.2 Frequency of Digital Payments

Table 2: Frequency of Digital Payment Usage

Sr.	Frequency	Number of Respondents	Percentage
1	Daily	48	48%
2	Weekly	32	32%
3	Monthly	15	15%
4	Occasionally	5	5%
5	Total	100	100%

Source: Primary Data

The data in Table 2 presents the frequency with which respondents use digital payment systems. A significant 48% of respondents use digital payments daily, while 32% use them weekly. This high frequency of usage demonstrates that digital payments are no longer occasional tools but have become a part of routine financial behaviour.

Only 15% of respondents use digital payments monthly, and a very small proportion (5%) use them occasionally. This indicates a strong level of trust and dependency on digital payment systems. The data clearly supports the argument that digital payments play a continuous and active role in facilitating both e-commerce transactions and e-banking services, strengthening their position in the vision of Viksit Bharat.

5.3 Purpose of Using Digital Payments

Table 3: Purpose of Using Digital Payments

Sr.	Purpose	Respondents	Percentage
1	Online Shopping (E-Commerce)	40	40%
2	Banking Transactions	35	35%
3	Bill Payments & Recharges	15	15%
4	Fund Transfers	10	10%
5	Total	100	100%

Source: Primary Data

The data in Table 3 highlights the primary purposes for which respondents use digital payments. Online shopping accounts for the highest share at 40%, followed closely by banking transactions at 35%. This shows that digital payments act as a **connecting link between e-commerce platforms and e-banking services**.

Bill payments and recharges (15%) and fund transfers (10%) further indicate the versatility of digital payments in handling various financial needs. The data confirms that digital payments are essential for both commercial and banking activities, reinforcing their role as the backbone of India's digital economy. The table also reflects changing consumer preferences towards cashless and technology-driven transactions.

5.4 Impact of Digital Payments on E-Commerce Growth

Table 4: Impact of Digital Payments on E-Commerce Growth

Sr.	Impact Area	Respondents	Percentage
1	Faster Transactions	38	38%
2	Increased Customer Trust	27	27%
3	Reduced Cash Dependency	20	20%
4	Improved Business Reach	15	15%
	Total	100	100%

Source: Primary Data

The data in Table 4 explains how digital payments contribute to the growth of e-commerce. Faster transactions are identified as the most significant impact by 38% of respondents, highlighting the importance of speed and convenience in online shopping. Increased customer trust, reported by 27% of respondents, shows that secure digital payment systems enhance confidence in e-commerce platforms.

Reduced dependence on cash (20%) indicates a shift towards prepaid and instant payment models, which improve operational efficiency for sellers. Improved business reach (15%) suggests that digital payments enable businesses to cater to a wider customer base. Overall, the table confirms that digital payments are a key driver of e-commerce expansion in India.

5.5 Role of Digital Payments in E-Banking Services

Table 5: Role of Digital Payments in E-Banking Services

Sr.	E-Banking Service Supported	Respondents	Percentage
1	Fund Transfers	45	45%
2	Online Bill Payments	25	25%
3	Mobile Banking Services	20	20%
4	Digital Loans & EMI Payments	10	10%
5	Total	100	100%

Source: Primary Data

The data in Table 5 focuses on the role of digital payments in supporting e-banking services. Fund transfers dominate with 45%, reflecting the importance of digital payments in enabling quick and secure money movement. Online bill payments (25%) and mobile banking services (20%) further demonstrate how digital payments enhance banking convenience.

Digital loans and EMI payments, though used by only 10% of respondents, indicate the growing integration of digital payments with advanced banking services. The table clearly shows that digital payments form the foundation of modern e-banking, reducing dependency on physical bank branches and improving service efficiency.

5.6 Challenges Faced in Using Digital Payments

Table 6: Challenges Faced in Using Digital Payments

Sr.	Challenge	Respondents	Percentage
1	Cyber Security Concerns	35	35%
2	Technical Issues	25	25%
3	Lack of Digital Literacy	20	20%
4	Network Connectivity Issues	20	20%
5	Total	100	100%

Source: Primary Data

The data in Table 6 identifies the major challenges associated with digital payment usage. Cyber security concerns are reported by 35% of respondents, making it the most significant challenge. This reflects growing awareness about digital fraud, data breaches, and online scams.

Technical issues such as transaction failures and system errors are faced by 25% of respondents, while lack of digital literacy and network connectivity issues are reported by 20% each. These challenges indicate that while adoption is high, there is still a need for improved infrastructure, awareness, and security measures. Addressing these challenges is essential for sustaining trust in digital payment systems.

5.7 Contribution of Digital Payments to Financial Inclusion

Table 7: Contribution of Digital Payments to Financial Inclusion

Sr.	Challenge	Respondents	Percentage
1	Cyber Security Concerns	35	35%
2	Technical Issues	25	25%
3	Lack of Digital Literacy	20	20%
4	Network Connectivity Issues	20	20%
5	Total	100	100%

Source: Primary Data

The data in Table 7 highlights the role of digital payments in promoting financial inclusion. Easy access to banking services is identified as the most significant contribution by 40% of respondents. This shows that digital payments help bridge the gap between banks and unbanked or underbanked populations.

Support to small businesses (30%) indicates that digital payments enable transparent and efficient business transactions. Transparency in transactions (20%) and reduced cash handling (10%) further contribute to economic formalisation. The table strongly supports the view that digital payments play a vital role in achieving inclusive growth, which is a key objective of the Viksit Bharat initiative.

6. Findings of the Study

1. The study reveals that digital payments have become an integral part of daily economic activities, with a significant proportion of respondents using them on a daily or weekly basis. This indicates a strong behavioural shift from cash-based transactions to digital modes.
2. Unified Payments Interface (UPI) has emerged as the most preferred digital payment system among users. Its ease of use, speed, and wide acceptance make it the backbone of both e-commerce and e-banking transactions in India.
3. Digital payments play a critical role in supporting the growth of e-commerce by enabling faster checkout processes, reducing dependence on cash-on-delivery, and improving customer trust in online platforms.
4. In the e-banking sector, digital payment systems significantly enhance service efficiency by facilitating fund transfers, bill payments, mobile banking, and digital loan repayments without the need for physical branch visits.
5. The findings indicate that convenience and time-saving are the primary factors motivating users to adopt digital payment systems, followed by perceived security and transparency in transactions.
6. Digital payments contribute positively to financial inclusion by providing easy access to banking services for small businesses, self-employed individuals, and first-time users of formal financial systems.
7. Despite widespread adoption, cyber security concerns remain a major challenge. Users are cautious about data privacy, fraud, and technical failures, which can affect trust in digital payment platforms.
8. Limited digital literacy and network connectivity issues continue to act as barriers, particularly for users in semi-urban and rural areas.

9. The study highlights that digital payments support transparency and traceability of transactions, which helps in reducing informal cash transactions and strengthening the formal economy.
10. Overall, digital payments serve as a strong foundation for the integration of e-commerce and e-banking, aligning closely with the objectives of the Viksit Bharat initiative.

7. Suggestions of the Study

1. Government and financial institutions should strengthen digital literacy programmes to educate users about safe and efficient use of digital payment systems, especially in rural and semi-urban regions.
2. Banks and payment service providers should continuously upgrade cyber security infrastructure to prevent fraud, data breaches, and unauthorized transactions, thereby enhancing user confidence.
3. Awareness campaigns should be conducted to promote best practices such as strong passwords, two-factor authentication, and caution against digital payment frauds.
4. Improvement in digital infrastructure, including reliable internet connectivity and mobile network coverage, is essential for expanding digital payment adoption across all regions.
5. E-commerce platforms should encourage prepaid digital payment options by offering incentives such as discounts, cashback, or faster delivery services.
6. Banks should simplify digital banking interfaces to make them more user-friendly for elderly users and first-time digital payment adopters.
7. Collaboration between government, banks, and fintech companies should be strengthened to promote innovation in digital payment solutions aligned with the goals of Viksit Bharat.
8. Regulatory authorities should ensure strict compliance with data protection and privacy norms to safeguard consumer interests in digital transactions.
9. Special initiatives should be designed to support small businesses and MSMEs in adopting digital payment systems for improved business efficiency and transparency.
10. Continuous monitoring and evaluation of digital payment systems should be undertaken to identify gaps and improve service quality in both e-commerce and e-banking sectors.

8. Conclusion

The study concludes that digital payments have emerged as a strong backbone for the growth and integration of e-commerce and e-banking in India. The increasing adoption of digital payment systems reflects a significant transformation in consumer behaviour, business practices, and banking operations. Digital payments have enabled faster, safer, and more transparent transactions, thereby strengthening trust in online commercial platforms and electronic banking services.

The findings clearly indicate that digital payment modes, particularly UPI, play a pivotal role in supporting daily financial transactions and promoting financial inclusion. By reducing dependency on cash, digital payments contribute to the formalisation of the economy and enhance ease of doing business. They also facilitate wider access to banking services for small businesses, entrepreneurs, and individuals in semi-urban and rural areas.

Despite these positive developments, challenges such as cyber security risks, digital illiteracy, and infrastructure limitations continue to exist. Addressing these challenges through improved digital infrastructure, enhanced cyber security measures, and widespread digital literacy programmes is essential for sustaining growth. Overall, digital payments act as a critical enabler in achieving the vision of Viksit Bharat by fostering inclusive growth, transparency, and a resilient digital economy.

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चक्रीय अर्थव्यवस्था (पुनर्निर्मिती, पुनर्वापर, दुरुस्ती)

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प्रस्तावना-

आजच्या जागतिक अर्थव्यवस्थेतील वेगाने होणारे औद्योगीकरण शहरीकरण आणि उपयोग वादी जीवनशैली यामुळे नैसर्गिक संसाधनावर मोठ्या प्रमाणात ताण निर्माण झाला आहे पारंपारिक रेषा अर्थव्यवस्था अल्पकालीन नफा देणारे असले तरी दीर्घकालीन दृष्टीकोनातून ती पर्यावरणीय सामाजिक आर्थिक समस्यांना कारणीभूत ठरते उत्पादन करणे वापरानंतर टाकून देणे या प्रदूषण आणि हवामान बदल यासारखे समस्यावर तीव्र या पार्श्वभूमीवर चक्रीय अर्थव्यवस्था (circular economy) ही संकल्पना पुढे आली आहे ही संकल्पना केवळ पर्यावरण संरक्षणापुरती मर्यादित नसून ती एक समग्र आर्थिक विकास मोडला आहे कचऱ्याचे रूपांतर संसाधनात करणे आणि मूल्य साखळी टिकून ठेवणे हे तिचे प्रमुख उद्दिष्ट आहे जागतिकीकरण औद्योगीकरण व वाढती लोकसंख्या यामुळे नैसर्गिक संसाधनावर प्रचंड ताण आला आहे अर्थव्यवस्थेमुळे उत्पादन केले जाते व वापरानंतर ते टाकून दिले जाते या प्रक्रियेमुळे पर्यावरण प्रदूषण कार्बन उत्सर्जन संसाधन टंचाई वाढते याला पर्याय म्हणून चक्रीय अर्थव्यवस्था उदयास आली

अभ्यासाचे महत्त्व

चक्रीय अर्थव्यवस्था ही शाश्वत विकासासाठी अत्यंत महत्त्वाची संकल्पना आहे. दुरुस्ती, पुनर्वापन व पुनर्निर्मितीच्या माध्यमातून संसाधनांचा कार्यक्षम वापर होतो. भारत व महाराष्ट्रासारख्या विकसनशील प्रदेशात वाढती लोकसंख्या, बेरोजगारी व पर्यावरणीय समस्या लक्षात घेता या अभ्यासाला विशेष महत्त्व प्राप्त होते. हा अभ्यास धोरणकर्ते, संशोधक व विद्यार्थी यांना आर्थिक व पर्यावरणीय समतोल समजून घेण्यास उपयुक्त ठरतो.

संशोधन प्रकल्पाचे उद्दिष्टे

- चक्रीय अर्थव्यवस्थेची संकल्पना सविस्तरपणे अभ्यासणे.
- दुरुस्ती, पुनर्वापन व पुनर्निर्मितीचे आर्थिक महत्त्व विश्लेषित करणे.
- महाराष्ट्र व भारतातील अंमलबजावणीची तुलना करणे.
- चक्रीय अर्थव्यवस्थेमुळे रोजगारनिर्मिती व खर्चावर होणारा परिणाम अभ्यासणे.
- या संकल्पनेतील अडचणी व त्यावरील उपाययोजना सुचवणे.

गृहीतके

- चक्रीय अर्थव्यवस्था स्वीकारल्यास उत्पादन खर्चात घट होते.
- दुरुस्ती व पुनर्निर्मिती क्षेत्र रोजगारनिर्मितीसाठी अधिक उपयुक्त आहे.
- चक्रीय अर्थव्यवस्थेमुळे पर्यावरणीय प्रदूषण कमी होते.
- महाराष्ट्रात चक्रीय अर्थव्यवस्थेची अंमलबजावणी भारताच्या तुलनेत अधिक प्रभावी आहे.

संशोधन पद्धती व सांख्यिकीय माहिती

सदर संशोधन अभ्यास वर्णनात्मक (Descriptive) व विश्लेषणात्मक (Analytical) स्वरूपाचा आहे. या संशोधनामध्ये चक्रीय अर्थव्यवस्थेच्या दुरुस्ती, पुनर्वापन व पुनर्निर्मिती या घटकांचा आर्थिक दृष्टिकोनातून अभ्यास करण्यात आला आहे.

वापरलेली सांख्यिकीय साधने —यासंशोधनात खालील सोपी व उपयुक्त सांख्यिकी साधने वापरण्यात आली आहेत :

1 टक्केवारी पद्धत (Percentage Method) : दुरुस्ती, पुनर्वापन व पुनर्निर्मिती क्षेत्रातील रोजगार वाटा, खर्चातील बदल दर्शविण्यासाठी टक्केवारी पद्धतीचा वापर करण्यात आला आहे.

2 सरासरी (Average / Mean) : उत्पादन खर्च, ऊर्जा वापर व रोजगार आकडेवारीचे विश्लेषण करण्यासाठी सरासरीचा वापर करण्यात आला आहे.

3 तक्ते (Tables) : संकलित माहिती स्पष्टपणे मांडण्यासाठी विविध तक्त्यांचा उपयोग करण्यात आला आहे.

4 आलेख व चित्रे (Graphs & Charts)

- स्तंभ आलेख (Bar Diagram)
- रेषीय आलेख (Line Graph)
- वर्तुळ आलेख (Pie Chart)

यांच्या माध्यमातून रेषीय व चक्रीय अर्थव्यवस्थेतील फरक स्पष्ट करण्यात आला आहे.

5 तुलनात्मक विश्लेषण : महाराष्ट्र व भारत यांच्यातील चक्रीय अर्थव्यवस्थेची अंमलबजावणी तुलना करण्यासाठी तुलनात्मक विश्लेषण पद्धतीचा वापर केला आहे. थोडक्यात निष्कर्ष: योग्य संशोधन पद्धती व सांख्यिकी साधनांच्या वापरामुळे अभ्यास अधिक विश्वसनीय, सोपा व शास्त्रीय स्वरूपाचा झाला आहे.

अभ्यासाचे क्षेत्र अभ्यासाचा कालावधी

हा अभ्यास भारत व महाराष्ट्र या भौगोलिक क्षेत्रांपुरता मर्यादित आहे. अभ्यासाचा कालावधी 2015 ते 2024 असा असून या कालावधीत प्रकाशित झालेल्या सरकारी अहवाल, संशोधन लेख व आकडेवारीचा वापर करण्यात आला आहे. अभ्यास मुख्यतः आर्थिक व पर्यावरणीय परिणामांवर केंद्रित आहे.

अभ्यासाच्या मर्यादा

सदर संशोधन अभ्यास चक्रीय अर्थव्यवस्थेच्या (दुरुस्ती, पुनर्वापन व पुनर्निर्मिती) संकल्पनेवर आधारित असून, या अभ्यासाला खालील काही मर्यादा आहेत :

1. द्वितीयक माहितीवर अवलंबित्व

या अभ्यासात प्राथमिक माहिती संकलन करण्यात आलेले नसून फक्त पुस्तके, अहवाल, जर्नल्स व संकेतस्थळांवरील माहितीवर आधारित आहे.

2. भौगोलिक मर्यादा

अभ्यास मुख्यतः महाराष्ट्र व भारत या क्षेत्रांपुरता मर्यादित आहे. इतर राज्ये किंवा देशांचा सखोल अभ्यास करण्यात आलेला नाही.

3. कालावधीची मर्यादा

संशोधनासाठी मर्यादित कालावधी उपलब्ध असल्यामुळे दीर्घकालीन परिणामांचे सखोल विश्लेषण करता आलेले नाही.

4. आकडेवारीची उपलब्धता

चक्रीय अर्थव्यवस्थेशी संबंधित अचूक व अद्ययावत आकडेवारी सर्व क्षेत्रांसाठी सहज उपलब्ध नाही.

5. सांख्यिकी साधनांची मर्यादा

या अभ्यासात फक्त सोपी सांख्यिकी साधने (टक्केवारी, सरासरी, तक्ते व आलेख) वापरण्यात आली आहेत. प्रगत सांख्यिकी विश्लेषणाचा वापर करण्यात आलेला नाही.

6. धोरणात्मक बदल

शासकीय धोरणे व पर्यावरणीय नियम वेळोवेळी बदलत असल्यामुळे काही निष्कर्ष भविष्यात बदलू शकतात.

विश्लेषण

चक्रीय अर्थव्यवस्था संकल्पना:

चक्रीय अर्थव्यवस्था प्रणाली आधारित संकल्पना आहे उत्पादनाच्या संपूर्ण जीवन चक्राचा विचार केला जातो उत्पादनाची रचना कच्च्यामाल निवड उत्पादन प्रक्रिया वापर दुरुस्ती पुनर्वापर पुनर्निर्मिती व शेवटी पुनर्चक्राण या सर्व

टप्प्यांमध्ये संसाधन कार्यक्षमता साधण्याचा प्रयत्न केला जातो अर्थशास्त्रीय दृष्टिकोनातून पाहिले असता पाहिले असता चक्रीय अर्थव्यवस्था हे बाह्य खर्च कमी करते प्रदूषण आरोग्य समस्या व पर्यावरणीय नुकसान सामाजिक कल्याण वाढते विक्री अर्थव्यवस्थेचा मुख्य उद्देश संसाधनाचा कमीत कमी वापर करून त्याचा जास्तीत जास्त कालावधीपर्यंत उपयोग करणे हा आहे उत्पादन डिझाईन वापर दुरुस्ती व पुनर्निर्मिती या सर्व टप्प्यांचा विचार केला जातो दुरुस्ती—दुरुस्ती हा चक्रीय अर्थव्यवस्थेचा सर्वात मूलभूत आणि प्रभावी घटक आहे उत्पादन बिघडल्यावर ते फेकून देण्याऐवजी दुरुस्त करून वापरणे ही संसाधन बचतीची सर्वात सोपी पद्धत आहे भारतासारख्या विकसनशील देशात दुरुस्ती संस्कृती पारंपारिक अस्तित्वात आहे.

आर्थिक दृष्टिकोनातून दुरुस्ती — उत्पादनाचा सीमांत खर्च कमी होतो, ग्राहकांचे वास्तविक वास्तविक उत्पन्न वाढते, स्थानिक लघु उद्योगांना चालना मिळते. दुरुस्ती श्रेष्ठ हे प्रामुख्याने श्रमा प्रधान असल्यामुळे बेरोजगारी कमी करण्यात मदत होते दुरुस्ती मुळे उत्पादनाच्या आयुष्य वाढते व ग्राहकांना खर्च कमी येतो मोबाईल इलेक्ट्रॉनिक वस्तू शेती अवजार यामध्ये दुरुस्तीच्या मोठा वाव आहे.

आर्थिक फायदे— ग्राहक खर्चात बचत, स्थानिक रोजगार निर्मिती, ई कचरा घट. -पुनर्निर्मिती ही औद्योगिक पातळीवरील चक्रीय अर्थव्यवस्था ची सर्वात प्रगत प्रक्रिया आहे या प्रक्रियेत वापरलेली उत्पादने परत घेऊन त्यात त्यांचे घटक वेगळे केले जातात तपासणी व दुरुस्ती करून ते नावे उत्पादन आहेत की कार्यक्षम बनवले जाते.

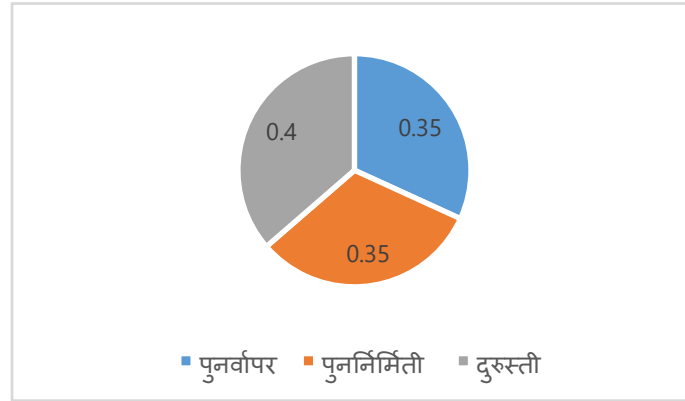
- आर्थिक परिणाम —उत्पादन खर्चात मोठ्या प्रमाणात बचत, औद्योगिक कचरात घट, निर्यात श्रम उत्पादन निर्मितीची संधी.
- आर्थिक महत्त्व —उत्पादन खर्चात त 30 ते 50% बचत, उद्योगाच्या नफ्यात वाढ, आयात अवलंबित्वात घट.
- भारत व महाराष्ट्रातील स्थिती —भारतामध्ये स्वच्छ भारत अभियान ई कचरा नियम स्टार्टअप धोरण यामुळे चक्रीय अर्थव्यवस्थेला चालना मिळत आहे महाराष्ट्र पुणे मुंबई कोल्हापूर येथे पुनर्वापन व दुरुस्ती आधारित उद्योग वाढत आहेत.
- चक्रीय अर्थव्यवस्था (दुरुस्ती पुनर्वापर पूर्ण निर्मिती) या संकल्पना भारत आणि विशेषतः महाराष्ट्रात हळूहळू विकसित होत आहे दोन्ही स्तरावर तिची अंमलबजावणी वेगवेगळ्या पातळीवर दिसून येते.
- भारत पातळीवर —भारत सरकार संसाधन कार्यक्षमतेच्या चालना देण्यासाठी विविध धोरण राबवले आहेत स्वच्छ भारत अभियान कचरा व्यवस्थापन नियम प्लास्टिक कचरा पुनर्नियम. पुनर्वापर पुनर्निर्मिती उद्योगांना प्रोत्साहन. एम एस एम इ क्षेत्र चक्री अर्थव्यवस्थेची अंमलबजावणी यामुळे रोजगार निर्मितीत कचरा कमी करणे पर्यावरण संरक्षणास मदत आहे
- महाराष्ट्र पातळीवर—महाराष्ट्र हे औद्योगिक दृष्ट्या प्रगत राष्ट्र असल्यामुळे चक्रीयअर्थव्यवस्थेची अंमलबजावणी तुलनेने अधिक प्रभावी होत आहे.
- घनकचरा व्यवस्थापन प्रकल्प—मुंबई पुणे नागपूर सारखे शहरांमध्ये पुनर्वापर उपक्रम औद्योगिक कष्टमध्ये पुनर्जन्मूती उद्योग स्टार्ट अप्स व खाजगी क्षेत्राचा सक्रिय सहभाग.
- भारत व महाराष्ट्राच्या तुलनात्मक निरीक्षण— भारत पातळीवर धोरणात्मक चौकट तयार होत असताना महाराष्ट्र महाराष्ट्रात त्याची प्रत्यक्ष अंमलबजावणी अधिक वेगाने होताना दिसते तथापि ग्रामीण भागात अजूनही जनजागृती व पायाभूत सुविधांचा अभाव आहे

भारत पातळीवर चक्रीय अर्थव्यवस्थेसाठी धोरणात्मक चौकट तयार करण्यात आली आहे मात्र अंमलबजावणी सर्व राज्यात समान नाही महाराष्ट्रात औद्योगिक प्रगती शहरीकरण आणि पायाभूत सुविधांमुळे चक्रीय अर्थव्यवस्थेची प्रत्यक्ष अंमलबजावणी अधिक प्रभावी दिसून येते तरीही ग्रामीण महाराष्ट्र व भारतातील ग्रामीण भागात जनजागृती तंत्रज्ञान व गुंतवणूक कमी असल्यामुळे अपेक्षित परिणाम अद्याप पूर्ण आहे पूर्णपणे साध्य नाही

घटक	भारत	महाराष्ट्र
धोरणात्मक चौकट	राष्ट्रीय पातळीवर धोरणे व नियम	राज्य पातळीवर अंमलबजावणी वर भर
कचरा व व्यवस्थापन	नियमित अस्तित्वात अंमलबजावणी असमान	महानगरामध्ये तुलनेने प्रभावी

पुनर्वापर उद्योग	वाढत्या टप्प्यात	औद्योगिक क्लस्टर मुळे वेगवान
रोजगाराची निर्मिती	MSMEक्षेत्रात संधी	शहरी भागात जास्त रोजगार
तंत्रज्ञान वापर	मर्यादित पण वाढता	स्मार्ट सिटी प्रकल्पात वापर
जनजागृती	ग्रामीण भागात कमी	शहरी भागात जास्त

चक्रीय अर्थव्यवस्थेतील घटकांचे प्रमाण

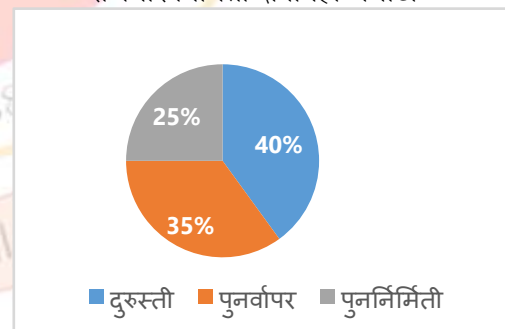


आर्थिक विश्लेषण: चक्री अर्थव्यवस्था ही केवळ पर्यावरण पूरक संकल्पना नसून ती दीर्घकालीन आर्थिक स्थैर्य निर्माण करणारे प्रणाली आहे. रेषीय अर्थव्यवस्थेत उत्पादनाचा सीमांत खर्च कालांतराने वाढत जातो कारण त्याचा कच्च्या मराठी टंचाई ऊर्जा खर्च आणि पर्यावरणीय नुकसान यांचा भार वाढतो या उलट चक्रीय अर्थव्यवस्थेत दुरुस्ती पुनर्वापन पूर्ण निर्मिती उत्पादनाची सरासरी किंमत कमी होते.

- उत्पादन खर्चावर परिणाम: चक्रीय पद्धतीत कच्च्या मालाची गरज कमी होत असल्याने आयात खर्चात घट होते विशेषतः भारतासारख्या देशात कच्च्या तेलावर आधारित प्राप्त इलेक्ट्रॉनिक घटक यांची आयात कमी होण्यास मदत होते.
- जीडीपी व आर्थिक वाढ : चक्री अर्थव्यवस्थेमुळे सेवा क्षेत्रात दुरुस्ती विसरते यामुळे जीडीपी मध्ये वास्तविक मूल्यवर्धन होते पारंपारिक उत्पादनापेक्षा ही वाढ अधिक शाश्वत स्वरूपाचे असते
- रोजगार निर्मिती व सामाजिक परिणाम: चक्री अर्थव्यवस्थेमुळे स्थानिक पातळ मोठ्या प्रमाणात रोजगार निर्मिती होते विशिष्ट दुरुस्ती दुकाने पुनर्वापर केंद्र लघु उद्योगांनी यामध्ये कुशल अर्धकुशल कामगारांना संधी उपलब्ध होतात

रोजगार निर्मिती क्षेत्रनिहायवाटा

प्रकार	उत्पादन खर्च निर्देशांक
रेषीय अर्थव्यवस्था	100
चक्रीय अर्थव्यवस्था	65



पर्यावरणीय परिणाम:

चक्री अर्थव्यवस्थेमुळे कार्बन उत्सर्जनात लक्ष्मी घट होते पुनर्निर्मिती प्रक्रियेमुळे नवीन उत्पादनासाठी लागणारी ऊर्जा 50% पर्यंत कमी होते.

- कार्बन उत्सर्जन तुलना: रेषीय अर्थव्यवस्था कार्बनचे जास्त उत्सर्जन चक्री अर्थव्यवस्था कार्बन से कमी उत्सर्जन.
- महाराष्ट्र व कोल्हापूर जिल्हा: कोल्हापूर जिल्ह्यातील लघुउद्योग शेती अवजारे दुरुस्ती केंद्र भंगार पुनर्वापर व्यवसाय हे चक्रीय अर्थव्यवस्थेची उत्तम उदाहरणे आहेत स्थानिक पाळीवर रोजगार वाढ व कचरा व्यवस्थापन सुधारलेले दिसून येतात.

- सैद्धांतिक चौकट: चक्रीय अर्थव्यवस्था ही पारंपरिक नाव अभिजात अर्थव्यवस्था मर्यादा ओलांडणारी संकल्पना आहे या चौकटी संसाधनाची मर्यादित उपलब्धता बाह्य खर्च आणि पिढ्यान् पिढ्यांनी यांचा विचार केला जातो. पर्यावरणीय अर्थशास्त्र शाश्वत विकास व संस्थात्मक शास्त्र यांचे एकत्रित चक्रीय अर्थव्यवस्थेत दिसून येते.

चक्री अर्थव्यवस्था व शाश्वत विकास उद्दिष्ट—अनेक राष्ट्रांच्या शाश्वत विकास उद्दिष्टांपैकी उद्दिष्टांचा चक्रीय अर्थव्यवस्था एक संबंध आहे दुरुस्ती पुनर्निर्मितीमुळे संसाधन कार्यक्षमता वाढते व हवामान बदलावर नियंत्रण मिळवता येते.

- फायदे—शाश्वत आर्थिक विकास, पर्यावरण संरक्षण, रोजगार निर्मिती
- आव्हाने—जनजागृतीचा अभाव, तांत्रिक मर्यादा, असंगठित क्षेत्र
- अडचणी—जनजागृतीचा अभाव, तांत्रिक ज्ञान व कौशल्याची कमतरता, भांडवलाची मर्यादा, असंगठित क्षेत्राचे वर्चस्व, योग्य धोरणात्मक अंमलबजावणीचा अभाव.
- उपायोजना —दुरुस्ती व पुनर्निर्मिती उद्योगांना कर सवलत देणे, जनजागृती मोहीम आखणे, कौशल्य विकास प्रशिक्षण कार्यक्रम, शैक्षणिक अभ्यासक्रमात चक्रीय अर्थव्यवस्था समाविष्ट करणे.

निष्कर्ष

सदर संशोधनातून असे स्पष्ट होते की चक्रीय अर्थव्यवस्था (दुरुस्ती, पुनर्वापन व पुनर्निर्मिती) ही संकल्पना शाश्वत आर्थिक विकासासाठी अत्यंत महत्त्वाची आहे. पारंपरिक रेषीय अर्थव्यवस्थेमुळे नैसर्गिक संसाधनांचा अतिवापर, कचऱ्यात वाढ व पर्यावरणीय समस्या निर्माण झाल्या आहेत. या पार्श्वभूमीवर चक्रीय अर्थव्यवस्था पर्यावरण संरक्षणासोबत आर्थिक वाढ साधण्यास उपयुक्त ठरते.

भारत पातळीवर चक्रीय अर्थव्यवस्थेसाठी विविध धोरणे व नियम अस्तित्वात असून त्यातून पुनर्वापर उद्योग, MSME क्षेत्र आणि रोजगारनिर्मितीस चालना मिळत आहे. तथापि, अंमलबजावणीमध्ये प्रादेशिक असमतोल, जनजागृतीचा अभाव व तंत्रज्ञानाची मर्यादा या समस्या अद्याप कायम आहेत. महाराष्ट्र राज्यात औद्योगिक विकास, शहरीकरण आणि पायाभूत सुविधांमुळे चक्रीय अर्थव्यवस्थेची अंमलबजावणी तुलनेने अधिक प्रभावी दिसून येते. विशेषतः घनकचरा व्यवस्थापन, पुनर्वापर उद्योग व स्टार्ट-अप्सच्या सहभागामुळे सकारात्मक परिणाम दिसून येत आहेत. तरीही ग्रामीण भागात या संकल्पनेचा प्रसार अधिक करण्याची आवश्यकता आहे. अखेर असे म्हणता येईल की योग्य धोरणे, तंत्रज्ञानाचा वापर, जनसहभाग आणि शासन—खासगी भागीदारी यांच्या माध्यमातून चक्रीय अर्थव्यवस्था भारत व महाराष्ट्रात दीर्घकालीन, समतोल व पर्यावरणपूरक आर्थिक विकास साधू शकते.

- भावी संधी—भविष्यात चक्रीय अर्थव्यवस्थेमुळे, नवीन रोजगारनिर्मिती, हरित उद्योगांचा विकास, ऊर्जा व संसाधनांची बचत, पर्यावरण संरक्षण व शाश्वत विकास, या क्षेत्रांत मोठ्या प्रमाणावर सकारात्मक बदल घडून येऊ शकतात.
- अंतिम निरीक्षण: योग्य धोरणे, आधुनिक तंत्रज्ञान, जनसहभाग व शासन—खासगी भागीदारी यांच्या माध्यमातून चक्रीय अर्थव्यवस्था भारत व महाराष्ट्रासाठी दीर्घकालीन आर्थिक व पर्यावरणीय विकासाचा मजबूत आधार ठरू शकते.

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The Cybersecurity Dilemma in Smart Homes and IoT Networks

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Abstract:

The rapid adoption of smart home technologies and the proliferation of Internet of Things (IoT) devices have transformed modern living, offering unparalleled convenience, automation, and connectivity. However, this interconnected ecosystem also introduces significant cybersecurity challenges.

Smart devices, ranging from thermostats and security cameras to kitchen appliances, often collect, transmit, and store sensitive personal data, making them attractive targets for cyberattacks. The lack of standardized security protocols, weak authentication methods, and software vulnerabilities exacerbate the risks, potentially leading to unauthorized access, data breaches, and privacy violations.

This paper examines the cybersecurity dilemmas inherent in smart homes and IoT networks, analyzing common attack vectors, threat models, and real-world incidents. It further explores contemporary security solutions, including encryption techniques, intrusion detection systems, and AI-driven threat mitigation, highlighting the need for a multi-layered security framework. By addressing both technological and human factors, this research aims to provide insights into creating safer and more resilient smart home environments while maintaining the benefits of IoT connectivity.

Keywords: Smart Homes, Internet of Things (IoT), Cybersecurity, Data Privacy, Network Vulnerabilities, Threat Mitigation

Introduction

The rapid advancement of technology has led to the widespread adoption of smart homes and Internet of Things (IoT) devices, fundamentally transforming the way people live, work, and interact with their surroundings. Smart homes integrate connected devices such as smart thermostats, security cameras, lighting systems, and household appliances, allowing users to control and automate their environment remotely. IoT networks, which link these devices through the internet, provide significant benefits, including energy efficiency, convenience, and enhanced quality of life.

However, the growing interconnectedness of these devices also creates substantial cybersecurity challenges. Many IoT devices are designed with limited processing power and insufficient security protocols, making them vulnerable to attacks. Hackers can exploit these weaknesses to gain unauthorized access, steal sensitive personal data, or even control devices remotely. Furthermore, the absence of standard security regulations and inconsistent software updates across devices complicates the mitigation of potential risks.

The “cybersecurity dilemma” in smart homes arises from the need to balance convenience, automation, and connectivity with robust protection against cyber threats. This paper explores the types of vulnerabilities present in smart home IoT networks, the common attack vectors exploited by cybercriminals, and the strategies and technologies available to strengthen cybersecurity. By addressing both technological and user-centric factors, the research highlights the importance of developing comprehensive security frameworks to safeguard IoT ecosystems without compromising their utility and benefits.

Literature Review

The rise of smart home technologies and IoT networks has been accompanied by a surge in research addressing their associated cybersecurity challenges. Scholars have consistently highlighted that while IoT devices provide convenience and automation, they are often designed with minimal security considerations, creating significant vulnerabilities (Sicari et al., 2015). Common issues include weak authentication

mechanisms, lack of encryption, and delayed or absent software updates, which expose smart home systems to threats such as unauthorized access, data breaches, and device manipulation.

Vulnerabilities in IoT Devices: Studies have shown that smart devices, including cameras, thermostats, and connected appliances, often have default passwords and insufficient access controls, making them prime targets for cyberattacks (Weber, 2010). Researchers emphasize that these vulnerabilities are amplified in home networks, where multiple devices interact without a centralized security management system.

Attack Vectors and Threats: Literature highlights that IoT networks are susceptible to a range of cyberattacks, including Distributed Denial of Service (DDoS), malware injection, and man-in-the-middle attacks (Alaba et al., 2017). The Mirai botnet incident is frequently cited as a case where unsecured IoT devices were exploited to launch large-scale attacks, demonstrating the real-world impact of these vulnerabilities.

Security Solutions and Frameworks: Researchers have proposed multiple strategies to mitigate IoT cybersecurity risks. Encryption techniques, secure communication protocols, intrusion detection systems (IDS), and AI-driven anomaly detection have emerged as effective measures (Yang et al., 2019). Additionally, some studies emphasize the importance of user awareness and proper device configuration as critical components of IoT security.

Research Gaps

Despite extensive studies, there remains a lack of standardized security protocols across IoT devices, and many solutions focus either on technical defenses or user practices without integrating both. Moreover, the rapid growth of IoT devices and smart home adoption continues to outpace security measures, creating a persistent “cybersecurity dilemma” where convenience and connectivity conflict with robust protection.

This literature review establishes that while significant research has been conducted on IoT security, the dynamic and heterogeneous nature of smart home environments requires continued investigation into integrated, multi-layered security frameworks to ensure both safety and usability.

Limitations include:

- Rapidly Evolving Technology.
- Limited Access to Real-World Data.
- Heterogeneity of IoT Devices.
- Focus on Technical Aspects.
- Geographical and Regulatory Constraints.
- Time and Resource Constraints.

Objectives

- To identify common security vulnerabilities present in smart home devices and IoT networks.
- To analyze the impact of cyber threats on user privacy, data integrity, and system availability in smart environments.
- To evaluate existing security mechanisms and standards used in IoT-based smart home systems.
- To assess the role of users, manufacturers, and service providers in mitigating cybersecurity risks.
- To explore the balance between usability, cost, and security in the design of smart home technologies.
- To propose strategies and best practices for improving cybersecurity in smart homes and IoT networks.

Methodology

This research adopts a **mixed-methods approach** combining threat modeling, vulnerability assessment, and risk evaluation to investigate cybersecurity challenges in smart homes and IoT networks. A representative smart home testbed is defined, including IoT devices, gateways, cloud services, and user

interfaces. **Threat modeling** is conducted using the STRIDE framework to identify potential attack vectors across device, network, and cloud layers.

Vulnerability assessment involves firmware analysis, network traffic inspection, and configuration testing to detect security and privacy weaknesses. Controlled experiments evaluate the **security–usability trade-off**, measuring attack success rates, performance impact, and user interaction complexity. Finally, risks are ranked using a **risk-based assessment**, illustrating the trade-offs between convenience, cost, and security inherent in smart home IoT ecosystems.

Analysis

Smart homes and IoT networks offer convenience but introduce significant security and privacy risks due to interconnected devices, weak authentication, and cloud dependencies. Vulnerabilities exist at device, network, and cloud levels, making attacks like unauthorized access, data theft, and device manipulation possible. Enhancing security often conflicts with usability, affordability, and device performance, creating the cybersecurity dilemma. High-risk devices like smart locks and cameras can lead to severe privacy or physical consequences, while even low-risk devices can act as gateways for attacks. Addressing these risks requires multi-layered strategies including secure design, regular updates, encryption, and user awareness. Ultimately, the challenge lies in balancing security with convenience and cost in smart home ecosystems.

Findings

- **Vulnerable Devices:** Many smart home IoT devices have weak authentication, default passwords, and unpatched firmware, making them prone to attacks.
- **Cloud-Related Risks:** Devices connected to cloud services face higher privacy and security risks due to potential data breaches and insecure APIs.
- **User Behavior:** Users often prioritize convenience over security, such as skipping updates or using simple passwords, which increases vulnerability.
- **Performance vs. Security Trade-off:** Resource-limited IoT devices may compromise security features to maintain performance, creating a systemic dilemma.
- **Network Interconnectedness:** A single compromised device can serve as a gateway to attack other devices in the smart home ecosystem.
- **Inconsistent Security Practices:** Encryption, firmware updates, and secure configurations are inconsistently implemented across different devices and vendors.
- **Usability vs. Security Dilemma:** The need for ease-of-use, affordability, and seamless integration often conflicts with implementing robust cybersecurity measures.

Conclusion

- Smart home IoT devices improve convenience but introduce significant security and privacy risks.
- Weak authentication, default credentials, unpatched firmware, and insecure communication are common vulnerabilities.
- Cloud-connected devices pose higher risks due to potential data breaches and third-party exposure.
- Users often prioritize usability and convenience over security, intensifying the cybersecurity dilemma.
- A compromise in one device can impact the entire smart home network due to interconnectedness.
- Effective mitigation requires a multi-layered approach, including secure-by-design devices, regular updates, encryption, and user awareness.
- Balancing security, usability, and cost remains the central challenge in securing smart home IoT ecosystems.

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Blockchain and Distributed Ledger Technology: Architecture, Applications and Security Challenges – A Comprehensive Review

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Abstract

Blockchain and Distributed Ledger Technology (DLT) represent a revolutionary approach to decentralized data management. Originally introduced through Bitcoin in 2008, blockchain enables secure, transparent, and tamper-resistant recording of transactions without centralized control. This paper analyzes blockchain architecture, consensus mechanisms, major applications, advantages, and limitations. A comparative study between traditional centralized systems and blockchain-based systems is presented. Although blockchain ensures transparency, immutability, and enhanced security, issues such as scalability, energy consumption, and regulatory uncertainty remain challenges. The study concludes that blockchain has significant potential to transform digital trust infrastructures across industries.

Keywords: Blockchain, Distributed Ledger Technology, Smart Contracts, Consensus Mechanism, Cyber Security

1. Introduction

Blockchain technology emerged as a breakthrough innovation in 2008 with the publication of the Bitcoin whitepaper by Satoshi Nakamoto. It introduced a decentralized peer-to-peer system that eliminates the need for intermediaries in financial transactions.

Unlike traditional centralized databases, blockchain distributes transaction records across multiple nodes in a network, ensuring transparency and tamper resistance. In traditional systems, data is stored on centralized servers, making them vulnerable to cyberattacks, unauthorized access, and single points of failure. Blockchain addresses these issues through cryptographic hashing, distributed consensus, and immutability. Over the past decade, blockchain has evolved beyond cryptocurrency into areas such as finance, healthcare, education, governance, and supply chain management.

2. Literature Review

Nakamoto (2008) first proposed blockchain as the foundation of Bitcoin. Zheng et al. (2017) described blockchain architecture, consensus mechanisms, and future research directions. Casino et al. (2019) provided a systematic review of blockchain applications across industries. Swan (2015) emphasized blockchain's economic transformation potential.

"According to **Buterin (2014)**, the evolution of blockchain 2.0 was marked by the introduction of programmable smart contracts via the Ethereum network. This allowed developers to create decentralized applications (dApps) that execute automatically when predefined conditions are met. Furthermore, **Yli-Huumo et al. (2016)** conducted a systematic review highlighting that while 80% of current research focuses on Bitcoin, there is a growing need to explore blockchain's impact on non-financial sectors like energy and logistics."

Existing research highlights benefits such as decentralization, transparency, automation through smart contracts, and enhanced security.

However, scalability issues, interoperability challenges, regulatory uncertainty, and high energy consumption remain major concerns.

3. Architecture of Blockchain

A blockchain consists of sequentially linked blocks connected through cryptographic hashes. Each block contains transaction data, timestamp, previous block hash, and its own hash value. This structure ensures immutability because altering one block requires modifying all subsequent blocks. Blockchain networks operate on peer-to-peer architecture. Nodes validate transactions and maintain ledger copies.

Merkle trees enable efficient verification of transactions within blocks. The decentralized structure enhances fault tolerance and reduces dependency on central authorities.

Comprehensive Architecture of Blockchain

Blockchain is essentially a chain of blocks where each block contains a list of transactions.

- **The Block Structure:** Each block consists of a Block Header and a Block Body. The header contains the 'Hash' of the previous block, creating a secure link.
- **Cryptography:** Blockchain uses SHA-256 (Secure Hash Algorithm) to ensure that even a tiny change in data results in a completely different hash, making tampering impossible.
- **Merkle Trees:** Within a block, transactions are organized in a Merkle Tree. This allows for rapid and secure verification of transactions within the block without needing to process the entire dataset.

4. Distributed Ledger Technology (DLT)

Distributed Ledger Technology refers to decentralized databases maintained across multiple participants. Blockchain is one form of DLT, while Directed Acyclic Graph (DAG) and Hashgraph are alternative models. DLT enhances transparency, security, and synchronization across nodes. It enables secure data sharing among organizations without a central controller. Permissioned and permissionless DLT systems provide flexibility depending on application requirements.

5. Types of Blockchain Networks

1. **Public Blockchain:** Completely decentralized (e.g., Bitcoin, Ethereum). Anyone can join and read/write data.
2. **Private Blockchain:** Permissioned network. Only authorized participants can join (used by banks).
3. **Consortium Blockchain:** Managed by a group of organizations rather than a single entity.
4. **Hybrid Blockchain:** A combination of private and public features, allowing controlled access with public verification.

6. Security Challenges and Vulnerabilities

Despite its secure nature, blockchain faces several threats:

- **51% Attack:** If an attacker gains control of more than 50% of the network's computing power, they can reverse transactions.
- **Sybil Attack:** An attacker creates many fake nodes to gain a majority influence over the network.
- **Smart Contract Vulnerabilities:** Since smart contracts are code-based, any bug or "loophole" can be exploited by hackers to steal funds (e.g., The DAO hack).
- **Phishing and Private Key Loss:** Since there is no central "Reset Password" button, losing a private key means losing access to assets forever.

7. Sector-Specific Applications

- **Supply Chain:** Real-time tracking of luxury goods, pharmaceuticals, and food to ensure authenticity and prevent counterfeiting.
- **Voting Systems:** Tamper-proof digital voting where every vote is recorded on the blockchain and can be audited by anyone.
- **Real Estate:** Automating property transfers and land registry to eliminate middlemen and reduce fraud.

8. Consensus Mechanisms

Consensus algorithms ensure agreement among distributed nodes.

Proof of Work (PoW) requires computational effort and is secure but energy-intensive. Proof of Stake (PoS) selects validators based on stake ownership and is more energy-efficient. Practical Byzantine Fault Tolerance (PBFT) is suitable for permissioned networks with faster validation. Each mechanism balances decentralization, security, and efficiency differently.

9. Applications of Blockchain

Blockchain has diverse real-world applications.

- **Banking and Finance:** Secure digital payments, cross-border transactions, fraud prevention, and decentralized finance (DeFi).
- **Healthcare:** Secure patient record management, drug traceability, and secure data exchange.
- **Education:** Digital certificates, academic credential verification, and transcript management.
- **Supply Chain Management:** Product traceability, anti-counterfeiting measures, and transparent logistics tracking.
- **E-Governance:** Transparent voting systems, public record management, land registration, and identity verification.
- **Insurance and Real Estate:** Smart contract automation and transparent claim processing.

These applications demonstrate blockchain's ability to enhance trust and reduce operational inefficiencies.

10. Advantages

- Decentralization
- Transparency
- Immutability
- Enhanced Security
- Reduced Intermediary Costs
- Improved Data Integrity
- Automation through Smart Contracts

11. Limitations

Despite its advantages, blockchain has limitations.

- Scalability Issues – Limited transaction throughput.
- High Energy Consumption – Especially in PoW systems.
- Regulatory Uncertainty – Lack of global standards.
- Technical Complexity – Requires specialized expertise.
- Storage Constraints – Growing blockchain size over time.
- Interoperability Challenges – Difficulty connecting multiple blockchains.

12. Future Scope: Integration and Scalability

The future of DLT lies in 'Interoperability'—the ability for different blockchains (like Bitcoin and Ethereum) to communicate seamlessly.

- **Layer 2 Solutions:** Techniques like "Sharding" and "Lightning Networks" are being developed to solve the speed and scalability issues.
- **AI & IoT:** Combining Blockchain with AI can create secure autonomous agents, while IoT devices can use blockchain for secure, automated payments.
- **Blockchain 3.0 and Beyond :** The future lies in 'Interoperability'—allowing different blockchains to talk to each other. Integration with Artificial Intelligence (AI) for smart decision-making and Internet of Things (IoT) for automated device payments will define the next decade. "Security remains a paramount concern.
- **Androulaki et al. (2018)** emphasized the importance of permissioned networks like Hyperledger Fabric for enterprise solutions, which provide higher throughput and privacy compared to public chains. As suggested by Christidis & Devetsikiotis (2016), the future of automated industries lies in the convergence of Blockchain and IoT, where devices can securely transact with each other without human intervention, ensuring data integrity across millions of connected sensors."

13. Conclusion

Blockchain and DLT are reshaping digital infrastructures by enabling decentralized trust mechanisms. While offering transparency, security, and immutability, blockchain must overcome scalability and regulatory challenges for widespread adoption.

With technological innovation and policy support, blockchain can serve as a foundational infrastructure for future digital ecosystems.

Figure 1: Basic Blockchain Architecture

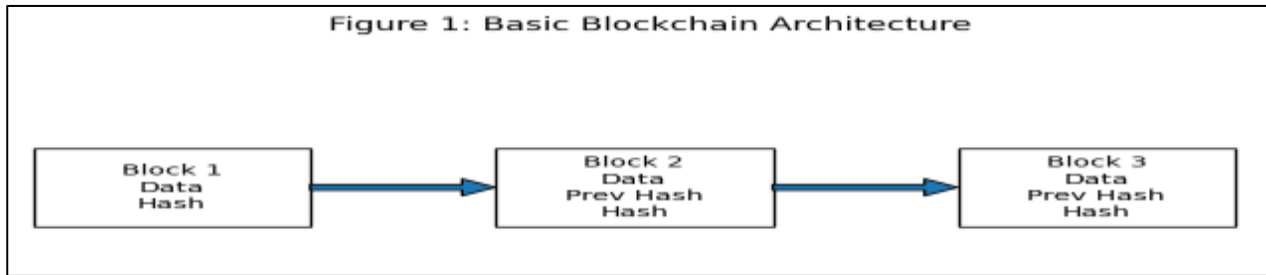


Table 1: Comparison between Traditional and Block chain System

Criteria	Traditional System	Blockchain System
Control	Centralized Authority	Decentralized Network
Transparency	Limited	High Transparency
Security	Single Point of Failure	Cryptographically Secured
Data Modification	Editable	Immutable
Trust	Based on Intermediaries	Based on Consensus Mechanism

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Artificial Intelligence and Data Science

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Abstract :

Artificial Intelligence (AI) and Data Science are two fields reshaped how organisations and societies process information, make decisions, and innovate. AI uses smart algorithms to learn and make decisions, while Data Science finds insights from large amounts of data. AI builds models that can learn, reason, and adapt, while Data Science uses methods to find insights from huge datasets. Their coming together has built powerful tools for predictive analytics, automation, intelligent and smart systems.

Key techniques like machine learning for predictive modelling, deep learning for complex pattern recognition, natural language processing for text and conversational analysis, and computer vision for automated visual interpretation are examined. They are applied in areas such as healthcare, finance, customer service, marketing, self-driving cars, manufacturing, and cyber security. The review also highlights current research challenges such as scalability, interpretability, and ethical concerns, while outlining future trends including explainable AI, federated learning, and responsible data-driven innovation.

This paper reviews the methodologies, techniques, applications, and challenges of AI in data science and analytics. It highlights the distinctive contributions of ML, DL, NLP, and computer vision, examines their impact across multiple sectors, and discusses current research challenges.

Keywords: Data Science, Deep Learning, Machine Learning, Artificial Intelligence, Data Analytics.

Introduction:

AI (Artificial Intelligence) is the field of computer science that focuses on creating systems capable of performing tasks that normally require human intelligence. These tasks include learning from data, reasoning, problem-solving, understanding language, and recognising patterns. For example Google Maps uses AI to suggest the fastest route by learning from traffic patterns. Chatbots in customer service use AI to understand questions and give helpful answers. AI is basically the “smart brain” inside apps and systems that helps them learn from data and act intelligently.

Data Science is the field that uses methods, tools, and techniques to collect, process, and analyse large amounts of data. Its goal is to find patterns, gain insights, and help make better decisions. For example in healthcare, data science can analyse patient records to predict diseases. IN business, it helps companies understand customer behaviour and improve products.

The integration of AI into data science has not only enhanced analytical capabilities but also expanded the scope of applications across diverse sectors. Together, they make systems smarter and more useful. In healthcare, AI supports diagnostic imaging and personalised treatment plans. In finance, it strengthens fraud detection and risk assessment. In customer service and marketing, it drives personalisation through chatbots and recommendation systems. In manufacturing, it enables predictive maintenance and quality control. In cyber security, it enhances anomaly detection and threat intelligence. Emerging domains such as autonomous vehicles further demonstrate the potential of AI to revolutionize industries by combining perception, reasoning, and real-time decision-making.

Methodology:

This paper is based on a structured review of academic literature, industry reports related to artificial intelligence in data science and analytics. Sources were identified using keywords such as *machine learning*, *deep learning*, *natural language processing*, *computer vision*, and *data analytics* across major databases and reputable publications. The collected materials were analysed and organised into three points AI and data science methodologies, applications across sectors, and challenges with future trends.

AI and data science Methodologies and Techniques

Artificial Intelligence (AI) brings together many different methods like machine learning, deep learning, natural language processing, and computer vision that form the foundation of modern data science and analytics.

Data Science prepares and analyses data, while AI adds intelligence to make predictions and decisions. Together, they power modern analytics.

- **Machine Learning (ML):** Machine Learning is a branch of Artificial Intelligence that focuses on building algorithms and models that can learn patterns from data and improve their performance over time without being explicitly programmed. Machine Learning teaches computers to learn from data and make smarter decisions.
- **Deep Learning (DL):** Deep Learning is a specialised branch of Machine Learning that uses artificial neural networks with many layers (“deep” networks) to learn complex patterns and representations from large datasets. Deep Learning teaches computers to recognise complex patterns in data, making them powerful for tasks like vision, speech, and language understanding.
- **Natural Language Processing (NLP):** Natural Language Processing (NLP) is a branch of Artificial Intelligence that enables computers to understand, interpret, and generate human language. It bridges the gap between human communication and machine comprehension. NLP helps machines “read, listen, and talk” in human language, making communication between people and technology smoother.
- **Computer Vision (CV):** Computer Vision is a field of Artificial Intelligence that enables machines to interpret and analyse visual information from the world, such as images and videos. It allows systems to “see” and make sense of visual data much like humans do.
- **Data Mining and Statistical Analysis:** Data Mining and Statistical Analysis are core methodologies in Data Science that focus on discovering meaningful patterns, relationships, and trends within large datasets. They provide the foundation for evidence-based decision-making and predictive modelling. Data Mining uncovers hidden patterns, while Statistical Analysis validates and explains them together, they make data science reliable and insightful.
- **Predictive Analytics:** Predictive Analytics is a methodology in Data Science that uses historical data, statistical models, and machine learning techniques to forecast future outcomes. It focuses on identifying patterns and trends to make informed predictions about what is likely to happen.

In following Steps AI connects with Data Science and Analytics:

- **Data Collection & Cleaning :** Raw data is gathered and prepared.
- **Data Science Analysis :** Statistical methods and visualisation help understand trends.
- **AI Methods :** Machine learning, deep learning, NLP, and computer vision add intelligence.
- **Insights and Actions :** Predictions, automation, and smart systems are created.

Here’s a real-world healthcare example showing above steps.

- **Patient Records :** Hospitals collect data like medical history, lab results, and scans.
- **Data Cleaning :** Errors and missing values are fixed to make the data reliable.
- **Data Science Analysis :** Trends are studied, such as which patients are at higher risk.
- **AI Models :** Machine learning and deep learning predict diseases or suggest treatments.
- **Predictions and Better Treatment :** Doctors use these insights to diagnose earlier and personalise care.

Applications of AI and Data Science:

- *Healthcare: In healthcare field Machine learning models predict patient risks and detect diseases early. Computer vision identifies tumours or abnormalities in scans. Predictive analytics tailor therapies to individual patients.*
- *Finance: In finance sector AI systems analyse transaction patterns to flag suspicious Predictive models assess credit risk and market volatility. AI-driven systems optimise investment strategies in real time.*
- *Retail & Marketing: Data mining reveals buying patterns and preferences. AI suggests products (e.g., Amazon, Netflix). Predictive analytics optimise inventory and supply chains.*
- *Transportation & Logistics: Computer vision and deep learning enable self-driving cars. AI-powered systems reduce delivery times and costs. Analytics forecast equipment failures before they occur.*
- *Cyber security: AI identifies unusual network activity to prevent attacks. Data science models spot deviations in system behaviour. AI systems react quickly to mitigate risks.*

- *Education & Libraries:* AI personalises educational content for students. Data science supports smart library systems and equitable access. NLP improves search and classification of digital resources.

Challenges & Ethical Considerations:

- *Data Privacy & Security:* Sensitive data (health records, financial transactions, personal identifiers) can be misused if not properly protected. Breaches or unauthorised access erode trust and can cause harm to individuals.
- *Algorithmic Bias & Fairness:* AI models often inherit biases present in training data, leading to unfair or discriminatory outcomes. Examples include biased hiring algorithms or facial recognition systems that perform poorly across different demographics.
- *Transparency & Explain ability:* Many AI systems, especially deep learning models, function as “black boxes” with limited interpretability. Lack of transparency makes it difficult for users to understand how decisions are made, raising accountability issues
- **Accountability & Human Oversight:** When AI systems make errors (e.g., misdiagnosis in healthcare or wrongful flagging in law enforcement), it is unclear who should be held responsible. Human oversight is essential to ensure ethical and lawful decision-making.
- **Digital Inequality & Access:** Advanced AI tools may widen the gap between organisations with resources and those without. Unequal access to AI-driven insights can reinforce existing social and economic inequalities.
- **Ethical Frameworks & Regulation:** Current ethical guidelines and regulations are still evolving.

Future Career Opportunities:

The future of careers in AI and data science is changing. Jobs are moving beyond traditional data analysis. They are becoming more advanced and strategic. Many organizations now use large AI systems. Companies like OpenAI and Google DeepMind develop these systems. Because of this, companies need new types of professionals. They need people who can build AI systems. They need people who can deploy and manage them. It is no longer enough to only analyse data. Professionals must understand how intelligent systems work and how to maintain them.

Here are some future career opportunities in AI and Data Science:

- **AI engineers** build and improve machine learning and deep learning models. They work on developing intelligent systems used in apps, automation tools, and business solutions.
- **Data scientists** analyse large amounts of data to find patterns and insights. They help companies make better decisions using predictive models and statistics.
- **ML engineers** design, train, and deploy machine learning models. They focus on making models work efficiently in real-world applications.
- **AI research scientists** develop new algorithms and improve AI technologies. They often work with research organisations like OpenAI and Google DeepMind.
- **MLOps engineers** manage the deployment, monitoring, and maintenance of AI models. They ensure models run smoothly and update them when needed.
- **AI product managers** guide the development of AI-based products. They connect technical teams with business goals and customer needs.
 - **AI Ethics and Governance Specialist** professionals ensure AI systems are fair, transparent, and follow regulations. This role is growing as governments introduce AI laws.
 - **Business Intelligence (BI) Analyst** use data tools to create reports and dashboards. They help organisations understand performance and trends.
- **Robotics engineers** combine AI with hardware to build intelligent machines. They work in areas like automation, manufacturing, and autonomous vehicles.
- **AI entrepreneurs** start businesses using AI technologies. They create innovative products, automation tools, or AI-based services.

Conclusion

In conclusion, Artificial Intelligence and Data Science are growing very fast. Artificial Intelligence and Data Science are changing industries, research, and everyday life very quickly. The integration of advanced machine learning models, big data analytics, and intelligent automation is reshaping how organisations make decisions, optimise operations, and deliver value. As technologies continue to evolve, contributions from leading research institutions and organisations such as OpenAI and Google DeepMind demonstrate the rapid progress and expanding capabilities of AI systems. Artificial Intelligence and Data Science technologies help organizations make better decisions. They improve efficiency and save time. Overall, AI and Data Science will continue to play a central role in scientific advancement, economic growth, and societal development in the years ahead.

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Edge Computing for Sustainable IoT Systems in Smart Cars

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Abstract

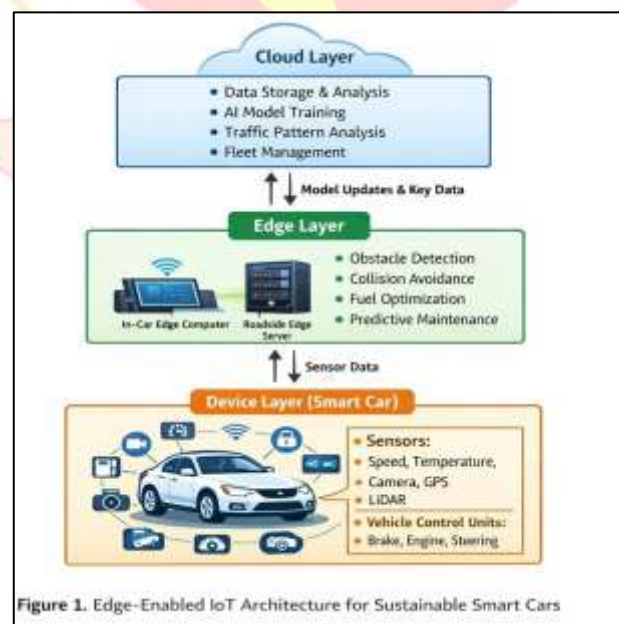
The increasing adoption of **Internet of Things (IoT)** technologies in **smart vehicles** has led to the generation of massive real-time data from sensors, cameras, and on-board systems. Traditionally, this data is processed in centralized cloud servers, which introduces latency, higher bandwidth usage, and increased energy consumption. **Edge computing** offers a **sustainable** alternative by enabling data processing closer to the source, either within the vehicle or at nearby edge nodes. This approach supports faster **decision-making for safety-critical applications** such as collision avoidance, traffic monitoring, and predictive maintenance. Additionally, edge-enabled IoT systems help **optimize fuel efficiency, reduce emissions, and minimize dependence** on energy-intensive cloud infrastructure. By combining low latency, efficient resource utilization, and real-time intelligence, edge computing plays a crucial role in building environmentally sustainable and intelligent transportation systems for future smart mobility.

1. Introduction

The rapid growth of Internet of Things (IoT) technologies has significantly transformed the automotive industry, enabling the development of smart cars equipped with sensors, cameras, and communication systems. These vehicles continuously generate large volumes of data related to traffic conditions, engine performance, driver behaviour, and environmental factors. Traditionally, this data is sent to centralized cloud servers for processing, which can result in higher latency, increased energy consumption, and heavy network dependence. Edge computing addresses these challenges by processing data closer to the source — within the vehicle or at nearby edge nodes — allowing faster decision-making and reduced data transmission. Integrating edge computing with IoT in smart cars not only improves real-time responsiveness for safety-critical applications but also contributes to sustainability by optimizing fuel usage, reducing emissions, and lowering the energy demand of cloud infrastructures.

2. Architecture of Edge-Based Sustainable IoT System

The system architecture consists of three main layers:



2.1 Device Layer (Vehicle Layer)

This layer includes sensors, cameras, GPS modules, and vehicle control units. These components collect real-time data about vehicle performance, surroundings, and driving conditions.

2.2 Edge Layer (On-board or Nearby Processing)

This layer processes data locally using on-board computers or roadside edge servers. It performs tasks such as obstacle detection, collision avoidance, fuel optimization, and predictive maintenance. Only important or summarized data is sent to the cloud.

2.3 Cloud Layer (Centralized Management)

The cloud is used for long-term storage, AI model training, traffic pattern analysis, and fleet management. Updated models and system improvements are then shared back with vehicles

3. Use Cases of Edge Computing in Smart Cars**3.1 Real-Time Autonomous Driving**

Autonomous vehicles rely on processing sensor data in real time. Edge computing enables:

- **Obstacle Detection:** Rapid identification of pedestrians and other vehicles.
- **Path Planning:** Instant computation of optimal trajectories.
- **Collision Avoidance:** Immediate actuation of brakes or steering.

3.2 Predictive Maintenance and Diagnostics

Edge analytics can monitor engine performance, battery health, and system anomalies locally. Instead of streaming raw data, vehicles send predictive alerts, reducing bandwidth and ensuring timely maintenance.

3.3 V2X Communication

Vehicles communicate with infrastructure (traffic lights), pedestrians (via mobile devices), and other vehicles. Edge nodes facilitate:

- **Traffic Signal Optimization:** Reducing idle time and emissions.
- **Cooperative Manoeuvring:** Synchronizing lane merging and platooning.

3.4 In-Vehicle Infotainment

Edge caching and processing improve:

- **Media streaming**
- **Personalized content delivery**
- **Reduced network buffering**

This enhances user experience while minimizing network load.

3.5 Energy Optimization

Edge computing contributes to energy management:

- **Battery Usage Optimization:** Real-time control for electric vehicles (EVs).
- **Efficient HVAC Operation:** Using local sensor data to optimize climate control.

4. Advantages**4.1 Reduced Latency, Increased Safety**

Faster responses reduce accident risks, indirectly lowering fuel consumption from abrupt braking and inefficient driving behaviours.

4.2 Lower Bandwidth and Energy Consumption

Local processing means only essential data travels to the cloud. This:

- Reduces data traffic on networks.
- Lowers energy use in data centers and communication channels.
- Decreases carbon footprint from compute and transmission.

4.3 Extended Vehicle Lifespan

By enabling predictive maintenance, edge systems help avoid catastrophic failures, lengthening the lifecycle of vehicle components.

4.4 Smart Routing for Energy Efficiency

Edge systems can optimize routes based on local traffic and energy consumption models, reducing trip time and emissions.

4.5 Enhanced Grid Interaction for EVs

Smart EV charging decisions can be made at the edge based on local grid conditions, reducing peak load stresses and enabling renewable integration. Data can be processed locally.

5. Challenges

5.1 Resource Constraints

Edge devices often have limited computational power and storage compared with cloud servers, requiring efficient algorithms and scheduling.

5.2 Scalability

Deploying and managing a large fleet of edge processors is complex and costly.

5.3 Interoperability

Vehicles and edge infrastructure from different manufacturers need standardized protocols.

5.4 Security and Privacy

While edge reduces some privacy risks by local processing, it introduces new attack vectors at physical and software levels.

5.5. Data Quality and Governance

Ensuring high-quality data across distributed edge nodes is challenging for analytics and learning.

6. Future Scope

6.1 6G and Beyond

Next-generation networks will further reduce latency and increase bandwidth, improving edge–cloud collaboration.

6.2 Federated Learning at the Edge

Vehicles can collaboratively train models using distributed learning without transmitting raw data, preserving privacy and reducing cloud dependency.

6.3 Energy-Aware Edge Algorithms

Developing edge AI that adapts based on power budgets and environmental conditions for better sustainability.

6.4 Standardization and Policy

Global standards for edge interfaces, data exchange, and safety will enable interoperable and secure systems.

7. Conclusion

Edge computing integrated with IoT technologies is shaping the future of smart and sustainable transportation. By processing data closer to the vehicle, edge systems reduce latency, improve safety, and decrease dependence on energy-intensive cloud infrastructures. Applications such as collision avoidance, predictive maintenance, and fuel optimization contribute to reduced emissions and better resource utilization. Although challenges such as security, cost, and system complexity remain, ongoing advancements in communication networks and edge intelligence make large-scale implementation increasingly feasible. Edge-enabled IoT architecture is therefore a crucial step toward greener, safer, and more efficient mobility solutions.

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Artificial Intelligence and Data Science as Pillars of Viksit Bharat @2047**Mr. Swapnil B. Khandagale**

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Abstract

Artificial Intelligence (AI) and Data Science have emerged as transformative forces reshaping global economies, business models, and governance systems. In the context of India's long-term development vision, Viksit Bharat @2047, these technologies play a pivotal role in enhancing productivity, competitiveness, and evidence-based decision making. This paper examines the significance of AI and Data Science from a commerce-oriented and working professional perspective, focusing on intelligent business processes, digital governance, and economic sustainability. It further analyzes ethical, legal, and skill-related challenges associated with large-scale adoption. The study concludes that with robust policy frameworks, institutional capacity building, and ethical implementation, AI and Data Science can serve as strong pillars for achieving inclusive and sustainable national development by 2047.

Keywords: Artificial Intelligence, Data Science, Commerce, Digital Economy, Viksit Bharat 2047

1. Introduction

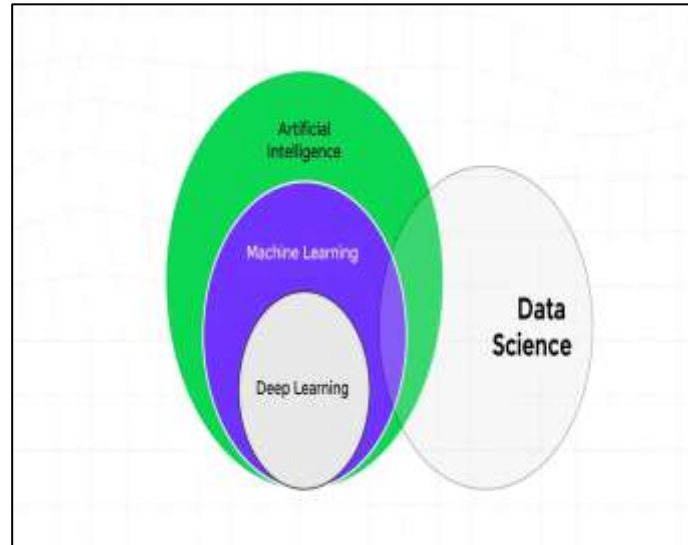
India is presently at a decisive stage in its development as it moves towards completing one hundred years of independence in 2047. The national vision of Viksit Bharat @2047 focuses on achieving inclusive growth, economic stability, digital empowerment, and global leadership. To realize these objectives, the adoption of advanced digital technologies has become essential across all sectors of the economy. Among these, intelligent computing systems and data-driven analytical approaches have emerged as key drivers of transformation, influencing decision-making processes and operational efficiency.

In sectors such as commerce, finance, governance, healthcare, and education, data-centric technologies enable organizations to move beyond traditional methods and adopt predictive and automated systems. These technologies assist institutions in analysing large volumes of information, identifying patterns, and supporting timely and accurate decisions. For commerce-oriented organizations, such advancements contribute to improved customer engagement, optimized supply chains, enhanced financial forecasting, and effective risk management. The ability to convert raw data into meaningful insights has become a strategic advantage in today's competitive business environment.

For working professionals, the integration of intelligent systems into daily operations has significantly altered job roles and skill requirements. Routine tasks are increasingly automated, allowing professionals to focus on strategic planning, problem-solving, and innovation. This shift demands continuous upskilling and adaptability to remain relevant in a rapidly evolving digital economy. Institutions of higher education and professional training therefore play a crucial role in equipping the workforce with analytical, technical, and ethical competencies.

In conclusion, intelligent technologies supported by data analytics form a strong foundation for India's journey towards sustainable and inclusive development. Their responsible and ethical adoption will be instrumental in strengthening economic resilience, improving governance, and positioning India as a globally competitive nation by 2047.

2. Conceptual Understanding of Artificial Intelligence and Data Science



Modern computing technologies have evolved to a stage where machines and software systems are capable of performing tasks that traditionally required human cognitive abilities. These tasks include learning from experience, logical reasoning, problem solving, decision making, and identifying patterns within large volumes of information. Such systems are designed to simulate intelligent behavior through algorithms and computational models, enabling automation and enhanced efficiency across multiple domains.

Data Science is an interdisciplinary field that focuses on extracting valuable insights from both structured and unstructured data. It integrates principles from statistics, mathematics, computer science, and domain-specific knowledge to analyze complex datasets. Techniques such as data cleaning, data mining, statistical analysis, visualization, and predictive modeling are central to this discipline. The objective is not only to process data but also to transform it into meaningful information that supports informed decision making.

In the contemporary digital economy, intelligent computing systems depend extensively on data-driven methods for their development and functioning. Large datasets are used for model training, performance evaluation, and continuous improvement of automated systems. The accuracy and effectiveness of these systems largely depend on the quality of data and the analytical techniques applied during processing. As a result, data science serves as the backbone for intelligent system design and deployment.

Together, intelligent computing technologies and data science form a unified ecosystem that supports advanced automation, real-time analytics, and predictive capabilities. This integration enables organizations to improve operational efficiency, enhance customer experiences, and gain strategic insights. In sectors such as commerce, finance, healthcare, and governance, the synergy between intelligent systems and data analytics plays a crucial role in driving innovation and sustainable growth.

3. AI and Data Science in Commerce and Business Management.

The field of commerce has emerged as one of the major beneficiaries of intelligent digital technologies and data-driven analytical methods. Businesses today operate in highly competitive and dynamic environments where timely and accurate decision making is critical. Advanced computational systems combined with data science techniques enable organizations to analyze large volumes of business data and convert them into actionable insights, thereby improving overall managerial effectiveness.

In the area of marketing, data-driven systems examine customer preferences, purchasing patterns, and behavioral trends to design personalized offerings. Such targeted strategies help organizations enhance customer satisfaction, strengthen brand loyalty, and improve sales performance. By understanding consumer behavior through analytical models, businesses can optimize pricing strategies, promotional campaigns, and product placement.

Financial management has also been significantly transformed through the use of intelligent analytical tools. Automated systems assist in identifying irregular transaction patterns, assessing financial risk, and ensuring regulatory compliance. These technologies support accurate credit evaluation, early detection of financial anomalies, and efficient reporting mechanisms, thereby strengthening financial transparency and organizational control.

Supply chain and operations management rely heavily on predictive and analytical models to improve efficiency. Data-based forecasting techniques help organizations anticipate market demand, manage inventory levels effectively, and minimize operational costs. Optimized logistics planning reduces delays, improves resource utilization, and enhances overall service quality. Such improvements contribute directly to organizational profitability and sustainability.

For working professionals in commerce and business management, the adoption of intelligent systems and data science has led to a shift in professional roles. Routine operational tasks are increasingly automated, allowing professionals to focus on strategic planning, analysis, and innovation. As a result, data literacy and analytical competence have become essential skills for career growth and competitive advantage in the modern business environment.

4. AI-Driven Digital Economy and Governance

The digital economy is increasingly dependent on data as a critical strategic resource for growth, innovation, and governance. The effective use of large-scale data and intelligent computing systems has transformed the way governments and public institutions operate. Data-driven governance models focus on improving transparency, accountability, and efficiency in public service delivery, thereby strengthening trust between citizens and institutions.

Modern governance frameworks use analytical and predictive techniques to support informed policy formulation and implementation. By analyzing historical and real-time data, governments are able to anticipate economic trends, assess public needs, and allocate resources more efficiently. Predictive models assist policymakers in identifying potential challenges and designing targeted welfare schemes that address specific socio-economic groups. This evidence-based approach enhances the effectiveness of public programs while minimizing resource wastage.

Digital platforms have further strengthened institutional capacity by enabling automation and integration of public services. Electronic payment systems promote financial inclusion and reduce dependency on cash-based transactions. Data-oriented tax systems improve compliance, enhance revenue collection, and support accurate economic assessment. Similarly, e-governance platforms facilitate faster service delivery, reduce administrative delays, and increase accessibility for citizens, particularly in remote and underserved areas.

For public administrators and working professionals involved in governance and policy implementation, data literacy and analytical skills have become essential competencies. The ability to interpret data, evaluate trends, and monitor performance indicators supports efficient decision making and accountability. These developments directly align with the objectives of *Viksit Bharat @2047*, which emphasize technology-driven governance, inclusive growth, and citizen-centric service delivery.

In conclusion, the integration of data-driven systems into the digital economy and governance framework strengthens institutional effectiveness and promotes sustainable development. Their responsible and ethical application will play a vital role in achieving India's long-term vision of a resilient, inclusive, and digitally empowered nation.

5. Applications for Working Professionals

The integration of intelligent digital systems and data-driven technologies has significantly transformed the professional work environment. For working professionals across commerce, management, and administrative domains, the nature of work has shifted from routine task execution to strategic analysis

and decision-oriented responsibilities. Automated systems now handle repetitive processes, allowing professionals to concentrate on planning, evaluation, and innovation.

Business intelligence platforms play a crucial role in supporting informed decision making. Interactive dashboards and analytical tools provide real-time insights into organizational performance, market trends, and operational efficiency. Data visualization techniques enable professionals to interpret complex information quickly and accurately, facilitating timely responses to changing business conditions. Predictive models further enhance decision quality by forecasting future outcomes based on historical and current data patterns.

Professionals equipped with strong data literacy and analytical competencies are better prepared to adapt to dynamic and competitive market environments. The ability to interpret datasets, identify trends, and evaluate performance indicators has become an essential professional skill. These competencies empower individuals to contribute meaningfully to organizational strategy, risk management, and performance optimization.

Continuous upskilling has emerged as a critical requirement in the digital era. As technologies and analytical methods evolve rapidly, professionals must regularly update their technical knowledge and practical skills. Training in data handling, analytical thinking, ethical use of technology, and digital tools enhances employability and career progression. Organizations also benefit from investing in skill development programs that foster innovation and adaptability among employees.

In summary, data-driven technologies have redefined professional roles by emphasizing analytical insight and strategic thinking. For working professionals, continuous learning and adaptability are key to sustaining relevance and achieving long-term career growth in an increasingly digital and competitive environment.

Figure 1: AI Commerce Workflow

Data Collection	Data Processing	AI / ML Models	Business Decisions
Customer, Sales, Financial Data	Cleaning, Integration, Analysis	Prediction, Classification	Strategy, Optimization, Growth

6. Ethical, Legal and Social Challenges



While intelligent computing systems and data-driven technologies offer numerous advantages, their widespread adoption also presents significant ethical, legal, and social challenges. One of the primary concerns is the protection of personal and organizational data. The extensive collection and processing of large volumes of information increase the risk of data misuse, unauthorized access, and privacy violations. Ensuring data confidentiality and secure handling has therefore become a critical responsibility for organizations and institutions.

Another important challenge relates to fairness and transparency in automated decision-making processes. Analytical models may unintentionally reflect biases present in historical data, leading to unequal or discriminatory outcomes. The lack of transparency in complex computational systems further complicates accountability, making it difficult to understand how decisions are generated. Addressing these issues requires the adoption of responsible design practices, regular audits, and clear documentation of analytical processes.

The social impact of intelligent technologies on employment is also a matter of concern. Automation of routine tasks can lead to job displacement in certain sectors, creating challenges for workforce stability and social equity. At the same time, new roles requiring analytical and digital competencies continue to emerge. Managing this transition demands proactive skill development initiatives, reskilling programs, and supportive labor policies to minimize adverse social effects.

To ensure responsible deployment, robust regulatory and ethical frameworks are essential. Data protection laws, governance standards, and ethical guidelines provide a foundation for lawful and fair use of digital technologies. For professionals in commerce and business management, ethical compliance is not only a legal requirement but also a strategic consideration. Adhering to ethical standards strengthens consumer trust, enhances corporate reputation, and supports long-term organizational sustainability.

In conclusion, addressing ethical, legal, and social challenges is vital for the sustainable and inclusive use of data-driven technologies in modern economies.

7. Future Scope towards Viksit Bharat @2047

India's progress towards becoming a developed nation by 2047 is closely linked to its ability to effectively adopt and govern advanced digital technologies. The future scope of intelligent computing systems and data-driven approaches in India depends largely on sustained investments in digital infrastructure, research and development, and human capital formation. High-quality data networks, secure digital platforms, and advanced computing resources are essential foundations for long-term technological growth.

Academic institutions play a crucial role in shaping this future by integrating analytical thinking, computational skills, and ethical awareness into curricula. Research-oriented learning environments encourage innovation and problem-solving abilities among students, preparing them for emerging professional roles. Collaboration between educational institutions and industry ensures that academic programs remain aligned with practical requirements and evolving market needs.

Industry participation is equally important in driving innovation and economic value creation. Organizations that invest in data-driven strategies and digital transformation are better positioned to enhance productivity, competitiveness, and sustainability. Public-private partnerships can accelerate technology adoption by combining technical expertise with policy support and financial resources. Such collaborative models foster an innovation ecosystem that promotes inclusive and balanced growth.

Government intervention through supportive policies and regulatory frameworks provides direction and stability to this ecosystem. Skill development initiatives, digital literacy programs, and ethical governance standards are necessary to ensure responsible and equitable use of intelligent technologies. Targeted training programs help prepare the workforce for future demands while minimizing the risk of technological exclusion.

In conclusion, the responsible integration of intelligent systems and data science into commerce, governance, and education can significantly contribute to India's developmental aspirations. With coordinated efforts from academia, industry, and government, these technologies can serve as powerful enablers of inclusive growth, economic resilience, and global competitiveness under the vision of *Viksit Bharat @2047*.

8. Conclusion

Advanced digital and data-driven technologies have moved beyond experimental adoption and have become essential components of national development strategies. Their growing influence across commerce,

governance, education, and professional practices highlights their role as strategic enablers rather than optional tools. By enabling automation, predictive analysis, and informed decision making, these technologies contribute significantly to economic efficiency, institutional effectiveness, and sustainable growth.

In the commercial sector, intelligent systems supported by data analytics enhance operational accuracy, improve risk management, and strengthen competitiveness. Governance frameworks benefit from data-centric approaches that promote transparency, accountability, and citizen-oriented service delivery. For working professionals, the integration of analytical tools into daily operations has redefined skill requirements, emphasizing critical thinking, adaptability, and continuous learning. Together, these transformations indicate a fundamental shift toward knowledge-driven development.

However, technological advancement must be balanced with ethical responsibility and social inclusion. Issues related to data protection, fairness, transparency, and workforce transition require careful policy intervention and institutional oversight. A development model that prioritizes ethical standards, regulatory compliance, and equitable access ensures that technological progress benefits all sections of society. Building public trust through responsible use of data and transparent decision processes is essential for long-term sustainability.

India's aspiration of achieving the vision of *Viksit Bharat @2047* depends on its ability to integrate innovation with inclusive growth. Coordinated efforts by government, academic institutions, industry, and professionals are necessary to create a resilient and future-ready ecosystem. By fostering a balanced approach that combines technological advancement with ethical governance and human development, India can effectively utilize data-driven technologies as strong pillars of economic progress and global competitiveness in the decades ahead.

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Cyber Security

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Abstract:

In this paper title “Cyber Security” includes social media platforms require our personal and sensitive information. Some of this information is shared voluntarily through posts and profile information and some is shared unknowingly through cookies (online activity trackers) which may log web page views, social media sharing and purchase history, or even location data. To many social media platforms are built on excessive collection, algorithmic processing, and commercial exploitation of users’ personal data. That must change. Cyber Security includes account hacking, phishing scams, data mining for identity thefts, malware infections and cyber bullying. Over the past two decades, social media platforms have become vast and powerful tools for connecting, communicating, sharing content, conducting business, and disseminating news and information. Today, millions or billions of users populate major social networks including Facebook, Instagram, Snapchat, YouTube, Twitter, LinkedIn, and dating apps like Grinder and Tinder. Scammers and cybercriminals can mine profiles for personal details that can be used as social engineering techniques in cyber-attacks or to guess login credentials.

Social Media Privacy and Prevention

While social media use has become the safety and privacy of these networks have become an increasing concern. Because of the amount of data users provide to these platforms—and how the platforms use this information—the question of social media privacy is one that’s being debated more and more. Although many governing bodies are now taking steps to implement social media privacy laws—and many companies are implementing policies to try and safeguard customer data—these protections are not enough for the average user. Understanding the risks of sharing personal information on social media is one way users can begin to protect their privacy. However, it is also important for users to learn what additional steps they can take to limit how much of their personal data they expose on these sites.

The Risks of Sharing Personal Information on Social Media

What are the tangible problems around security and privacy in social networks? There are, in fact, many—and all users should be aware of these before they sign up for an account. This is because not paying attention to the risks of sharing personal information on social media can have significant implications on an individual’s—or company’s—reputation and finances, amongst other things. While there are myriad issues around social media privacy to consider, here are some of the most pertinent.

1. **More susceptibility to hacking:** One of the biggest problems with social media privacy is that scammers and cybercriminals can mine profiles for personal details that can be used as social engineering techniques in cyber-attacks or to guess login credentials, for example.
2. **Increased exposure to phishing:** Social media sometimes encourages interactions between strangers, and hackers exploit this to execute phishing attacks. For example, this can occur by sending unsolicited messages on Instagram that require the recipient to provide personal details to claim a prize for a fictitious contest.
3. **Real-time location tracking:** Geotagging and real-time sharing means that it can be possible to track a particular user’s location at any given time—this can be especially dangerous, for example, if thieves use this to identify whether someone is at home.
4. **Potential for data mining:** Social media data privacy is a major problem because these networks use data for most of their operations, including customizing services, showing ads, analyzing their customers, and building business models—information such as dates of birth, emails, and locations are prime for data-mining and social media platforms can do what they like with this.
5. **Potential for identity theft:** With all the data that social media networks collect, they present a huge opportunity for cybercriminals to harvest information about individuals—this could lead to identity theft and financial scams, such as credit card fraud.
6. **Impact on job opportunities:** Many employers admit to checking candidates’ social media profiles as part of the hiring process—the problem is that the lack of privacy on social media can impact careers if

employers are making employment decisions based on what they see online.

7. **Exposure to cyber bullying:** Social media gives ill-intentioned individuals the ability to bully or stalk others anonymously, which has already caused a significant mental health crisis, especially among teenagers.
8. **Potential risk of Doxing:** Malicious individuals can mine social media for private information that can later be released publicly to embarrass or otherwise negatively damage a person's reputation.
9. **Loopholes that encourage data exposure:** For example, even if one individual has strong privacy settings on their social media profile, the content they tag other people in could be shared publicly.
10. **Data sharing with third-parties:** In most cases, the usage terms for social media platforms require users to agree to let the platform share information with third-parties, which can be used in various ways, such as for targeted advertising—this is a significant social media privacy concern and the reason why it is important to read these terms when registering an account.
11. **Permanent digital footprints:** All posts on social media—including links, photos, and comments—remain part of the platform in question, even if the original user deletes their content, and can potentially be discovered at any time—this is why users should always take the time to consider the implications of posting something before going ahead.
12. **Additional attack vectors for malware:** Social media gives cybercriminals an additional way to launch attacks, for example, by sending malware through private messages on these platforms.
13. **Addictive potential:** Social media networks are designed to keep users engaged and active, but this can lead some to display obsessive behavior that impacts their real lives.
14. **Spread of misinformation:** Because there is very little ability to regulate the content on social media, it is rife with false information and propaganda—the issue is so insidious that it has become nearly impossible to distinguish fact from fiction on these platforms.

Privacy: Issues with Data

Understanding social network privacy issues is one step toward mitigating the problem. But users who really want to protect themselves while staying connected online should understand what type of data is most pertinent to these concerns. This can help them make more informed decisions about how they use these networks and what information they share. In some cases, data is shared involuntarily, purely through the use of these networks. For example, tracking cookies on these sites track a user's online activity, which could include what websites they visit, what they share on their profiles, and what they buy online. This type of data is particularly useful for advertisers, who can then create customized advertising segments to target particular users.

However, other details that third-parties—including hackers—might be able to harvest from social media include:

- Relationship status
- Employment history
- Religious affiliation
- Gender
- Age
- Phone numbers and email addresses
- Hometowns or current location (or even exact address)
- Check-in locations
- Hobbies
- Interests
- Shared photos, videos, personal updates, and links
- Social media engagement, such as likes and shares

All of this information is incredibly useful in profiling social media users. While this is often used to create personalized social media experiences—such as targeted ads and suggested accounts to follow—hackers can also mine this information to fine-tune social engineering tactics to increase the success of their attacks.

Cyber Security Privacy Laws

To address the lack of privacy on social media, many governments and international organizations have implemented legal instruments that help mitigate some of the issues that have arisen around these networks.

The General Data Protection Regulation (GDPR) is a European policy that protects personal data. Among its many stipulations, the GDPR requires users to opt in or sign up for marketing and agree to privacy policies. The GDPR also includes the Right to be Forgotten law, which allows individuals to request that all their data be deleted from company databases.

The American equivalent of the GDPR is the California Consumer Privacy Act (CCPA), which is a social media privacy law that came into effect in 2020. This limits the ability of tech companies to harvest data and bestows individuals with more power over the use and handling of their personal information. The CCPA could also dictate what data social media networks can collect from users.

The US also protects minors from social media privacy concerns through the Children's Online Privacy Protection Rule (COPPA). In effect since 2000, the law requires all online services and website operators to ensure the privacy of children under the age of 13. For example, sites must prove they have parental consent to collect personal information on minors, and limit how they can market to this group with cyber bullying another major issue, Australia introduced the Social Media (Anti-Trolling) law in 2022 to regulate network use alongside its Online Privacy Bill. Together, these help social media users file complaints against defamation, require the verification of users' age, and implement penalties for privacy breaches.

How to protect yourself from Cyber Attacks : Of the many questions about privacy in social media, that of how to protect yourself on social media is arguably the most pertinent. Of course, it is possible to simply not create a social media account or otherwise use these platforms. However, in a digitally-connected society, this is impractical for most people – at the very least, most people will want a professional profile on LinkedIn for corporate networking. No matter how little or how extensively someone chooses to engage with social media, there are numerous measures that they can implement to mitigate social media privacy concerns. Here are a few things to consider:

1. **Avoid sharing trackable details:** Try not to share details or photos and videos that allow followers to see live locations or daily routines – sharing after leaving a location is good practice.
2. **Never share any identification:** Social security numbers, driver's licenses, bank account numbers, passport numbers, or any other unique identification numbers represent one of the biggest social media security issues because they can result in identity theft and financial fraud.
3. **Share as few personal details as possible:** Most social media platforms ask users to fill out an "About" section that includes birthdays, hometowns, schools, and interests – this can be used nefariously for social engineering, so share the absolute bare minimum.
4. **Try to limit followers:** Social media is built around the idea that everyone is a potential friend, and cybercriminals play on this – except for public figures or those that otherwise require a public profile, it is best to only accept connection requests from people who are personally known or maintain a private account.
5. **Use strong passwords:** Use a password manager to create and store unique passwords to enhance the security of social media accounts.
6. **Enable enhanced login features:** To maximize social media data privacy, most social media platforms offer multifactor authentication and usually require users to enable this for additional security.
7. **Use heightened privacy settings:** Most social media platforms enable basic default privacy settings when users set up an account, but the onus is on the user to fine-tune these—take the time to go through these and put them on the highest appropriate settings.
8. **Enable automatic logouts:** Social networking sites usually have a setting that allows automatic logouts when accounts are accessed on unrecognized devices or unknown locations—make sure this setting is enabled.
9. **Avoid public Wi-Fi:** Try not to log into social media accounts using public, insecure public Wi-Fi networks—hackers can use this to steal login credentials and take over the associated social media profile. If necessary, be sure to use a reliable virtual private network (VPN).
10. **Monitor security alert emails:** Most social networks automatically send out security alerts by email when logins are attempted from unknown devices or locations – check these to make sure there are no unauthorized logins. Be aware that some security alert emails can be phishing scams, so avoid clicking links or attachments.
11. **Delete inactive accounts:** Any social networking accounts that are dormant should be deleted as these are additional attack vectors for hackers.
12. **Keep software up to date:** Ensure all software and apps—including browsers and social network apps—are up to date and deploy the latest security patches.

13. **Read the terms:** When signing up for an account, take a few minutes to read the site's terms to see what data will be taken and how it will be used—this can have significant implications for social media data privacy.
14. **Post with care:** Even though they can be deleted, all photos, videos, and posts on social media leave a digital footprint. Additionally, photos that show identifiable details—such as boarding passes, school names, or street signs, can be used by cybercriminals.
15. **Turn off geolocations:** In most cases, geolocation services are not required to use social media—turning this off also ensures posts are not automatically geotagged.
16. **Ensure friends and acquaintances are aware of your preferences:** Social media usage has become so commonplace that many people forget to think about how posts may affect others—those who prefer not to appear in others' posts—or, for example, do not want to publicly share images of their children—should make these concerns known. Always ask for permission before posting, and always take down posts if asked.

Enhancing cyber security awareness and protective practices

To enhance security, the U of A recommends logging into social media accounts via web browsers whenever possible, which provides additional control and security measures. Reviewing app terms and conditions is also crucial for making informed decisions about personal information usage. By understanding risks, being proactive and following recommended security practices, U of A community members can protect their information and contribute to a safer digital environment.

1. Enable multi-factor authentication (MFA) on your social accounts whenever possible.
2. Access your account through a web browser instead of through the app. This can provide additional security, as apps can ask for or require access to other functions of mobile devices.
3. Ensure you set and/or update your privacy settings on every social account you use.
4. Limit or don't share personal information such as your birthdate, address, phone number or real-time location.
5. Be cautious of suspicious messages or links, even if they appear to be from someone you know.
6. Report any posts or messages that appear to be scams.
7. Use unique and complex passwords. View these tips on how to create strong passwords.
8. Avoid logging into accounts while using public Wi-Fi networks, which can be more vulnerable to cyber-attacks.
9. Be aware of the news regarding social media platforms. Recent data breaches or news about the activities of social media companies can help us take preventative action or make informed decisions.

Challenges in Maintaining Data Privacy on Social Media

Complex systems, evolving cyber threats and user behavior have left social media platforms with significant hurdles in data privacy. These challenges require technological innovation, robust policies and user awareness.

- **Data Breaches:** Many users don't know that they are sharing too much of their personal information, making them a prime data breach candidate. **For Example**, geotagging posts can disclose the user's exact location and make the users unsafe.
- **Ineffective privacy policies:** Some platforms' privacy policies are vague or overly complex and it is hard for users to understand how their data is treated. The opacity often results in misinformed consent.
- **Third-Party Apps:** Social media integration with third party apps can result in data sharing which users don't intend to. **For example**, quiz apps on Facebook that ask for a user's profile information, which can then be sold or misused.

Conclusion

Social Media's data privacy is an important matter which requires an appropriate balance of the user awareness, legal frameworks and technological advancements. Transparent policies and strong security should be taken up by platforms on which users must perform proactive measures to protect their information. The digital age poses some challenges that should be addressed by regulations; thus, governments and organizations should continue improving regulations to cope with emerging challenges.

Social media privacy includes personal and sensitive information that people can find out from user accounts. Some of this information is shared voluntarily through posts and profile information. Information also may be released unknowingly through tracking cookies, which track the information of a user's online activity, including webpage views, social media sharing and purchase history. All information is then gathered and sorted by user segments, which data brokers sell for marketing purposes. Examples of categories may be fitness enthusiast, pet lover or parent. With these categories, companies can personalize marketing campaigns to users on social media. However, scammers and fraudsters also collect this information to better gain access to personal information. The Federal Trade Commission (FTC) reported one in four people who lost money due to fraud said contact with the attacker started on social media. The FTC also reported scams from social media from 2021 hit \$2.7 billion, which is the highest of any other fraud contact. This number could be even higher because a majority of fraud does not get reported.

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Governance, Digital Infrastructure, and Cybersecurity: Pathways to Viksit Bharat @2047**Ms. Nikita Nitin Gaikwad**

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India's vision of Viksit Bharat @2047 positions digital infrastructure as a key driver of inclusive growth, governance efficiency, and economic transformation. The rapid expansion of Digital Public Infrastructure (DPI), AI-enabled services, cloud platforms, and satellite-terrestrial connectivity has strengthened service delivery but also intensified cybersecurity risks. This paper examines the emerging cybersecurity challenges associated with India's large-scale digital ecosystem, focusing on expanded attack surfaces, centralized data systems, AI-driven cyber threats, and uneven cybersecurity preparedness across rural and urban regions. It highlights how vulnerabilities in critical digital infrastructure can affect citizen trust, economic stability, and national security. The study argues that cybersecurity must be treated as a foundational component of digital infrastructure rather than a reactive measure. Strengthening security-by-design practices, cyber awareness, institutional capacity, and human capital is essential to ensure a secure, resilient, and inclusive digital transformation aligned with the goals of Viksit Bharat @2047.

Keywords: Cybersecurity, Viksit Bharat @2047, Digital Infrastructure, Digital Public Infrastructure, Digital Inclusion

1. Introduction

India's journey toward Viksit Bharat is increasingly driven by digital transformation across governance, economy, and society. Over the past decade, the expansion of digital infrastructure—supported by high-speed connectivity, cloud computing, mobile platforms, and Digital Public Infrastructure (DPI)—has reshaped service delivery in sectors such as finance, healthcare, education, agriculture, and public administration. Initiatives enabling digital identity, direct benefit transfers, and real-time payments have enhanced efficiency, transparency, and inclusion at an unprecedented scale.

As digital systems become deeply embedded in critical national functions, cybersecurity has emerged as a foundational requirement rather than a peripheral technical concern. The scale, speed, and interconnectivity of digital platforms have significantly expanded the cyber-attack surface, increasing exposure to data breaches, service disruptions, financial fraud, and misuse of sensitive information. Cyber threats now pose risks not only to individual users but also to economic stability, governance continuity, and national security.

The challenge is further intensified by the rapid adoption of emerging technologies such as artificial intelligence, cloud-native architectures, Internet of Things (IoT), and data-driven decision systems. While these technologies offer productivity gains and innovation, they also introduce complex vulnerabilities that traditional security mechanisms are often ill-equipped to manage. At the same time, uneven levels of digital literacy and institutional cyber preparedness—particularly in rural and semi-urban regions—create asymmetric risks and weaken overall system resilience.

In this context, cybersecurity must be viewed as an integral component of digital infrastructure and inclusive development. A secure and trusted digital ecosystem is essential for sustained adoption, citizen confidence, and equitable participation in the digital economy. This research situates cybersecurity within India's broader development framework and examines its role in enabling a resilient, inclusive, and sustainable digital future aligned with the vision of Viksit Bharat.

2. Conceptual Framework of Cybersecurity

The conceptual framework of cybersecurity defines the principles, structures, and processes through which digital systems are protected against cyber threats. Cybersecurity is not limited to technical defence mechanisms; rather, it represents an integrated framework that combines technology, governance, human behaviour, and institutional coordination to ensure secure and reliable digital operations. At its core, cybersecurity aims to preserve the confidentiality, integrity, and availability (CIA) of digital assets, which form the foundational objectives of any secure information system.



This framework operates across multiple layers. At the technical layer, it includes network security, encryption, authentication, access control, and secure software development practices. The organizational layer encompasses policies, standards, incident response mechanisms, and compliance structures that guide secure digital operations. The human layer addresses user behaviour, cyber awareness, and skill development, recognizing that human error remains a major source of vulnerability.

Modern cybersecurity frameworks increasingly emphasize security-by-design and resilience, where systems are designed to anticipate attacks, minimize damage, and recover rapidly rather than relying solely on perimeter-based defenses. The adoption of Zero Trust architectures, continuous monitoring, and risk-based security management reflects this shift. Furthermore, emerging technologies such as artificial intelligence and cloud computing require adaptive security models capable of responding to dynamic and automated threats.

In a national digital ecosystem, the cybersecurity framework must extend beyond individual organizations to include inter-agency coordination, public-private partnerships, and regulatory oversight. Conceptually, cybersecurity thus functions as a foundational pillar of digital infrastructure, enabling trust, continuity, and inclusive participation in the digital economy.

3. Digital Infrastructure Landscape in India

India has developed one of the world's largest and most inclusive digital infrastructure ecosystems, driven by rapid expansion in connectivity, platforms, and digital public services. Nationwide programmes such as BharatNet, 4G saturation initiatives, and 5G deployment have significantly improved broadband penetration and mobile internet access across urban and rural regions. Public Wi-Fi initiatives and satellite-based connectivity are further extending coverage to remote and underserved areas, strengthening the digital backbone of the economy.

A defining feature of India's digital landscape is its Digital Public Infrastructure (DPI), which includes platforms for digital identity, payments, data exchange, and service delivery. These systems have enabled scalable, interoperable, and low-cost digital services across governance, finance, healthcare, and education. Cloud computing, data centers, and edge infrastructure are increasingly supporting AI-driven applications, real-time analytics, and large-scale digital transactions.

However, the digital infrastructure landscape remains uneven. Urban centers benefit from high-speed networks, advanced data services, and greater institutional capacity, while rural and semi-urban regions

continue to face challenges related to last-mile connectivity, affordability, and technical support. This disparity affects not only access but also the quality and security of digital services.

As India advances toward a digitally integrated economy, the robustness, resilience, and security of its digital infrastructure become critical. The effectiveness of this landscape will ultimately depend on its ability to deliver reliable, secure, and inclusive digital services that support economic growth, governance efficiency, and social inclusion in alignment with national development goals.

4. Key Cybersecurity Challenges

India's rapidly expanding digital infrastructure faces multiple cybersecurity challenges that threaten the reliability, trust, and sustainability of its digital ecosystem. One of the primary challenges is the expansion of the attack surface due to large-scale digitization of governance, financial services, healthcare, and agriculture platforms. As more services move online, vulnerabilities in networks, applications, and endpoints increase significantly.

A second major challenge is uneven cybersecurity preparedness across regions and institutions. While urban centers and large organizations often possess advanced security capabilities, rural administrations, small enterprises, and community-level digital systems frequently lack skilled personnel, standardized security practices, and adequate resources. This asymmetry creates weak links that adversaries can exploit.

Data security and privacy risks also remain critical concerns. The extensive use of centralized databases and real-time data sharing heightens exposure to data breaches, identity theft, and misuse of sensitive personal information. Inadequate data protection awareness among users further exacerbates these risks.

The rise of AI-enabled and automated cyber threats, including phishing, deep fakes, and adaptive malware, poses additional challenges by outpacing traditional defence mechanisms. Furthermore, low levels of cyber hygiene and digital literacy among a large segment of users increase susceptibility to fraud and social engineering attacks.

Collectively, these challenges highlight the need for proactive, resilient, and inclusive cybersecurity strategies integrated into India's digital development framework.

5. Policy and Regulatory Framework

India's cybersecurity ecosystem is guided by a combination of national policies, sectoral regulations, and institutional mechanisms aimed at securing its expanding digital infrastructure. The National Cyber Security Policy (2013) provides the foundational vision for protecting information infrastructure, enhancing cyber resilience, and building skilled human capital. Although dated, it continues to influence capacity-building and coordination efforts across government and critical sectors.

Recent regulatory developments have strengthened the framework. The Telecommunications Act, 2023 modernizes the legal regime governing digital communications, enabling technology-neutral authorizations and improved oversight of networks that are increasingly software-defined and data-driven. Complementing this, data protection regulations emphasize lawful data processing, user consent, and accountability, addressing growing concerns related to privacy, data misuse, and large-scale digital databases.

Institutionally, agencies such as CERT-In play a central role in incident response, threat advisories, and coordination during cyber emergencies. Sector-specific guidelines for banking, telecom, and critical infrastructure further reinforce baseline security standards. However, gaps remain in enforcement consistency, rural institutional preparedness, and alignment with emerging threats such as AI-enabled cyberattacks and cross-border cybercrime.



Overall, while India's policy and regulatory framework has evolved to support a secure digital ecosystem, continuous updating, stronger implementation, and inclusive capacity-building are essential to ensure cybersecurity keeps pace with the vision of Viksit Bharat.

6. Role of Cyber Awareness and Digital Literacy

Cyber awareness and digital literacy play a critical role in strengthening cybersecurity within an increasingly digital society. While technological safeguards are essential, human behavior remains a decisive factor in determining the effectiveness of cybersecurity systems. Limited awareness of cyber risks, unsafe online practices, and inadequate understanding of data privacy significantly increase vulnerability to cyber threats such as phishing, fraud, and identity theft.

Digital literacy must extend beyond basic device usage to include understanding of online safety, secure authentication practices, data protection, and identification of misinformation. As digital services expand into governance, financial transactions, agriculture, and healthcare, users must be equipped to engage with these platforms safely and responsibly. This is particularly important in rural and semi-urban areas, where first-time digital users often lack exposure to cybersecurity risks.

Cyber awareness initiatives, community-level training programmes, and integration of cybersecurity education into formal curricula can significantly reduce human-related vulnerabilities. Public campaigns, local digital facilitators, and institutional training can help build trust in digital systems and encourage secure adoption. Moreover, an informed and cyber-aware population supports national resilience by acting as the first line of defence against cyber threats.

Therefore, cyber awareness and digital literacy are not supplementary measures but foundational elements of a secure, inclusive, and sustainable digital ecosystem aligned with India's development objectives.

7. Technological and Strategic Solutions

- AI-Enabled Cybersecurity Tools
Use of artificial intelligence and machine learning for real-time threat detection, anomaly identification, and automated incident response
- Zero Trust Architecture
Continuous verification of users, devices, and applications with least-privilege access to reduce internal and external threats
- Cloud-Native and Application Security
Adoption of secure software development practices, container security, and continuous security monitoring in cloud environments.
- Security-by-Design Approach
Integration of cybersecurity measures at the planning and development stage of digital infrastructure rather than post-deployment.
- Public-Private Partnerships (PPP)
Collaboration between government, industry, and academia for threat intelligence sharing and coordinated cyber defence.
- Cybersecurity Workforce Development
Training and upskilling programmes to address the shortage of skilled cybersecurity professionals.
- Quantum-Resistant Cryptography
Preparation for future cyber threats by adopting cryptographic systems resistant to quantum computing attacks.

8. Future Roadmap and Recommendations

As India advances toward the vision of Viksit Bharat, cybersecurity must evolve in parallel with digital infrastructure expansion. The future roadmap should prioritize resilience, inclusivity, and future-readiness rather than reactive security responses. Cybersecurity must be embedded as a core component of national digital development, ensuring that innovation does not outpace protection.

In the short term, strengthening institutional coordination, expanding cyber awareness programmes, and standardizing baseline security practices across sectors—especially in rural and semi-urban regions—are essential. Medium-term priorities should focus on AI-driven security systems, Zero Trust adoption in public digital platforms, and large-scale workforce upskilling. In the long term, India must invest in quantum-safe cryptography, sovereign cybersecurity technologies, and international cooperation to address cross-border cyber threats.

Policy frameworks should be updated regularly to reflect emerging risks, while public–private collaboration must be institutionalized for intelligence sharing and rapid incident response. Ensuring equitable cybersecurity capacity across regions will be critical to maintaining trust and sustainability in India’s digital ecosystem.

9. Conclusion

India’s rapid digital transformation has created unprecedented opportunities for economic growth, governance efficiency, and social inclusion. However, this expansion has simultaneously intensified cybersecurity risks, making digital security a critical pillar of the vision of Viksit Bharat. As digital infrastructure penetrates deeper into governance, finance, agriculture, and public services, vulnerabilities arising from uneven preparedness, limited cyber awareness, and emerging AI-driven threats become increasingly pronounced.

This study highlights that cybersecurity challenges in India are not purely technical but socio-technical in nature, requiring a balanced integration of advanced technologies, strategic policy frameworks, and human capacity development. Strengthening digital literacy, adopting security-by-design principles, and promoting public–private collaboration is essential for building trust and resilience within the digital ecosystem.

Looking ahead, a proactive, inclusive, and future-ready cybersecurity approach—supported by continuous policy evolution and innovation—will be crucial to ensuring that India’s digital infrastructure remains secure, resilient, and equitable. Cybersecurity, therefore, must be viewed not merely as a defensive requirement but as a foundational enabler of sustainable national development.

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Blockchain and Distributed Ledger Technology

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Abstract

Blockchain and Digital Ledger Technology (DLT) have emerged as transformative innovations with the potential to revolutionize diverse industries like financial services, supply chain, healthcare, governance, and more. Originally designed to support decentralized digital currencies (e.g., Bitcoin), blockchain's core characteristics are immutability, decentralization, transparency, and cryptographic security that present novel opportunities for improving trust and efficiency in multi-party systems. This paper reviews the development of blockchain and DLT, explores theoretical foundations, examines applications in multiple sectors, discusses key challenges, and outlines future research directions.

Keywords: Blockchain, Distributed Ledger, Decentralization

Introduction

Digital systems that require trusted collaboration among multiple participants have historically depended on centralized intermediaries (e.g., banks, clearinghouses). However, these centralized models can be costly, opaque, and vulnerable to single points of failure.

Blockchain is a secure, shared digital system for recording information that cannot easily be changed. A specific type of distributed ledger seeks to remove central intermediaries by enabling secure, decentralized record keeping. **Digital Ledger Technology (DLT)** more broadly refers to any distributed system that maintains synchronized copies of a ledger across nodes without a central authority.

Blockchain structure is a chain of cryptographically linked data blocks stored across a distributed network, ensuring security, transparency, and immutability. A typical blockchain consists of data blocks that are encrypted, digitally secured, algorithmically protected. Each block contains:

- Transactions
- A timestamp
- A cryptographic hash of the previous block

This forms a tamper-evident chain that strengthens integrity.

Distributed Ledgers

A **Distributed Ledger** is a decentralized digital system for recording transactions or data across multiple network nodes, where each participant maintains a synchronized copy of the ledger. Unlike traditional centralized databases, a distributed ledger does not rely on a single central authority to validate, store, or control the data.

In a distributed ledger system, updates to the ledger are validated through a consensus mechanism and then replicated across all participating nodes. This ensures that all copies remain consistent and accurate. The use of cryptographic techniques secures the data, making unauthorized alterations highly detectable and practically infeasible.

Literature Review

Early Work in Blockchain

The foundational paper by Satoshi Nakamoto (2008) introduced blockchain as part of Bitcoin's architecture. Later studies focused on improving how blockchain systems agree, grow, and protect privacy.

Academic Studies on DLT

Researchers have investigated the potential of Distributed Ledger Technology (DLT) to enhance auditability, streamline transaction reconciliation processes, and strengthen trust among multiple stakeholders within complex, multi-party systems.

Comparisons with Traditional Databases

Unlike centralized databases, DLT ensures:

- Decentralization
- Immutable records
- Automated trust without intermediaries

However, traditional databases still perform better in raw throughput and latency.

Sectorial Applications

Financial Services

Blockchain in financial services provides **faster, cheaper, more secure, and transparent solutions** for payments, lending, asset management, and regulatory compliance. Blockchain supports:

- Cross-border payments
- Smart contracts
- Tokenization of assets

Real-world cases: Ripple, Ethereum-based decentralized finance (DeFi) platforms.

Supply Chain

Blockchain technology improves end-to-end traceability within supply chains, enabling transparent tracking of products from their origin to the end customer. For instance, in the case of perishable goods, blockchain facilitates accurate monitoring, reduces the risk of fraud, and enables faster, more effective product recalls.

Healthcare

Blockchain in healthcare can significantly enhance security, transparency, and efficiency while empowering patients with greater control over their medical data. However, widespread adoption requires overcoming regulatory, technical, and operational challenges. DLT has potential in:

- Secure patient data sharing
- Health records interoperability
- Credential management
- Reduced fraud
- Better patient empowerment
- Increased transparency.

Government and Identity

- Governments can use blockchain to create secure digital IDs for citizens. It can be useful for reducing identity fraud, gives citizens control over personal data, provide simplified access to public services.
- Blockchain prevents tampering with land ownership records.
- Blockchain can support secure electronic voting.
- Government contracts and spending can be recorded on blockchain, which can be helpful for corruption reduction, auditability improvement, tracking fund usage in real time. This is especially valuable in developing nations fighting misuse of public funds.
- Secure sharing of medical data between hospitals and agencies.
- Blockchain can streamline tax reporting and reduce fraud.
- Used for tracking government supply chains (e.g., food distribution, defense equipment).

Methodology:

This study employs a mixed-method research design combining case study analysis and prototype implementation. Secondary data were collected from peer-reviewed journals, government publications, and documented blockchain implementations. System performance was evaluated based on transaction speed, security features, and scalability metrics.

Challenges and Limitations

- **Scalability** : Scalability refers to a blockchain network's ability to handle a growing number of transactions efficiently without compromising performance, cost, or decentralization. It is one of the biggest barriers to mass adoption.
- **Energy Consumption**: Blockchain's energy footprint depends heavily on its consensus mechanism—Proof of Work is costly, while PoS and newer models are far more sustainable for enterprise adoption.

- **Regulatory Uncertainty:** Regulatory uncertainty in blockchain stems from fragmented laws, cross-border complexities, and unresolved issues around privacy and financial compliance. Organizations must balance innovation with proactive risk management until clearer global standards emerge.
- **Interoperability:** Interoperability is essential for blockchain's long-term viability, enabling collaboration across networks and integration with existing systems. While solutions like Polkadot, Cosmos, and cross-chain bridges are advancing, security and standardization remain critical challenges. Multiple ledgers with differing protocols challenge seamless integration.
- **Privacy vs Transparency:** Blockchain inherently promotes transparency, but this can conflict with privacy requirements. The future lies in hybrid solutions—combining open auditability with advanced privacy-preserving techniques to meet both regulatory and enterprise demands. Balancing transparency with confidentiality is an on-going research topic.

Conclusion

In this paper, I have illustrated and discussed the key traits of distributed ledger technologies and blockchain platforms in particular, with a focus on the technical mechanisms Blockchain and DLT represent disruptive innovations with the capacity to reshape many sectors. Despite technical and regulatory challenges, continued research — in scalable architectures, governance, and applications — will determine how widely these technologies are adopted. Blockchain possesses certain properties like transparency, security, traceability, tradeability, privacy and data auditability, and when harnessed in the proper direction it can bring about major change in the technical world. Hashing makes the blockchain robust, as it impedes changes in older transactions without altering the whole sequence of blocks that follow. Mechanisms such as Proof of- Work and Proof-of-Stake ensure that the publishing rights of new blocks are given to nodes that prove their reliability.

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Sustainable Development Through Smart Technologies**Asst. Prof.Mrs.Kadam Archana Shrikant
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Sustainable improvement has grown to be a worldwide priority as nations attempt to balance financial boom, environmental protection, and social well-being. With growing concerns over climate change resource depletion, and pollutants, progressive answers are needed to ensure a sustainable future. smart technologies, along with synthetic Intelligence (AI), the internet of Things (IOT), block-chain, and renewable energy systems play a important role in driving sustainable improvement through improving performance, decreasing waste, and promoting environmentally pleasant practices

Keywords : *AI in Sustainability, Block-chain for Sustainability, Carbon Footprint reduction, round economy, smooth electricity, climate alternate solutions, virtual Sustainability,Eco pleasant era.*

Introduction

smart technologies are playing a essential role in using sustainable improvement via enhancing efficiency, decreasing waste, and promoting environmentally pleasant practices.these technologies include AI, IOT, block-chain, and renewable electricity structures, which are critical for optimizing processes, improving decision making, and ultimately reducing carbon footprints. smart technologies permit industries to display and control resources with unheard of precision, promoting electricity efficiency and waste minimization throughout sectors. They are not simplest reshaping industries however additionally pushing forward revolutionary procedures sustainability that deal with the needs of present day conscientious consumers and regulatory pressures. smart technologies, consisting of artificial Intelligence (AI), the internet of things (Io T), blockchain, and renewable energy systems, play a vital role in driving sustainable development by enhancing efficiency, decreasing waste, and selling environmentally friendly practices.

1.Sustainable development means

The idea of sustainable development was first defined by the Burundian fee (1987) as “development that meets the needs of the prevailing with out compromising the capacity of future generations to meet their very own desires.”

1.1 3 Pillars of Sustainability : Sustainable development is constructed upon 3 key pillars:

- 1.Environmental Sustainability – protective ecosystems, lowering pollution, and selling renewable electricity.
- 2.Financial Sustainability – making sure long-term economic increase with out harming natural sources.
- 3.Social Sustainability – improving best of life, making sure get right of entry to to sources, and promoting social equity.

clever technology support all 3 pillars by way of fostering energy efficiency, lowering environmental impact, and allowing smarter decision-making.

2.The function of smart technology in Sustainable improvement**2.1 Smart energy structures and Renewable technologies**

Transitioning to clean and renewable electricity sources is a key purpose of sustainable development. smart technologies enhance electricity efficiency and optimize its usage Io T-enabled clever grids beautify energy distribution, reduce electricity loss, and integrate renewable sources like sun and wind energy. AI

algorithms are expecting energy demand, optimize electricity usage, and save you power wastage in houses and industries. Decentralized block-chain networks permit peer-to-peer electricity trading, permitting clients to promote excess solar energy to the grid.

2.2 Clever Transportation and inexperienced Mobility

The transportation sector is one in every of the biggest participants to greenhouse fuel emissions. clever technology are transforming mobility by eco-friendly transportation-solutions like AI-powered smart grids make sure green EV charging, decreasing the strain on energy structures. clever site visitors structures use sensors and AI to optimize traffic waft, reducing congestion and emissions. Self-riding electric powered cars and clever experience-sharing offerings decrease energy consumption and enhance efficiency.

2.3 Sustainable Agriculture via Precision Farming

Agriculture must emerge as greater green and environmentally pleasant to feed the growing international population. clever farming technologies assist reduce waste, preserve water, and enhance productiveness. Sensors screen soil moisture ranges and optimize water utilization, stopping over-irrigation. AI algorithms examine satelliteTV for PC photos and drone information to discover crop diseases and are expecting yields. Blockchain guarantees traceability in food deliver chains, reducing food waste and promoting fair alternate.

2.4 Smart towns for Sustainable urban improvement

Urbanization is increasing swiftly, making sustainable city planning critical. smart town technologies help reduce useful resource consumption and improve residents' quality of lifestyles Smart bins with fill-stage sensors optimize waste series and inspire recycling.

AI controls clever lighting fixtures and HVAC structures, reducing energy waste in homes.

Sustainable structure integrates solar panels, vertical gardens, and rainwater harvesting to lessen environmental effect.

2.5 Water Conservation and smart Water control

Water scarcity is a developing worldwide problem. smart technologies permit green water control by way of reducing waste and improving distribution. IoT-enabled clever Meters tune water intake in actual time, detecting leaks and selling conservation. AI complements water purification through optimizing remedy methods and decreasing chemical utilization.

superior filtration and desalination technology offer sustainable water solutions.

2.6 AI and large information for Environmental tracking

real-time environmental tracking facilitates governments and organizations combat pollutants and climate exchange. AI and large information analytics enhance choice-makingthrough Air quality monitoring is done by using IoT sensors monitor air pollution stages, permitting targeted movement to reduce emissions. weather Prediction models uses AI-powered simulations expect weather developments and natural disasters, aiding disaster preparedness.

Deforestation and natural world Conservation can be done by AI-powered drones and satellite tv for pc imagery display forests and guard biodiversity.

3. Challenges and boundaries to clever era Adoption

1. high initial fees – investing in clever infrastructure calls for huge capital.
2. statistics privacy worries – IoT and AI rely on statistics series, elevating protection troubles.
3. Technological limitations – developing countries can also lack get admission to to advanced technology.
- four. Resistance to alternate – Industries and governments may be sluggish to undertake new technologies.
5. Regulatory and coverage Gaps – Inconsistent rules avoid the improvement of sustainable answers.

4 . Future potentialities of clever technologies in Sustainability

looking in advance, several rising tendencies will form the destiny of sustainable improvement:

1. AI-pushed round economy – AI and IoT will beautify waste reduction and useful resource performance.
2. 5G and part Computing – faster connectivity will enable actual-time monitoring of smart grids and smart towns.
3. Improvements in green technology – innovations in biodegradable substances, carbon capture, and energy garage will power sustainability.

stronger authorities rules – Stricter guidelines will encourage companies to adopt sustainable practices.

with the aid of embracing these technologies, the arena can flow towards a smarter, greener, and extra sustainable future.

Clever technologies are transforming the way we method sustainable improvement, offering progressive solutions to climate alternate, resource conservation, and pollution manipulate. From smart grids and AI-pushed energy management to IoT-based waste tracking and precision agriculture, these technology play a critical function in creating a balance between economic growth and environmental protection.

To obtain proper sustainability, governments, businesses, and individuals need to paintings together to accelerate the adoption of smart technology, ensuring a greener and greater resilient future for generations to return.

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Emerging Cyber Security Threats and Defense Mechanisms**Miss.Shradha S. Chaudhari**Department of B.C.A
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Technology is changing quickly, which has caused more cyber security problems. These issues can cause big trouble for people, companies, and countries. This paper looks at new cyber security dangers and ways to protect against them, focusing on the present threats, weaknesses, and steps taken to defend against them. The study uses both qualitative and quantitative methods together to look into the types of new threats and what works best in defending against them.

Introduction

More and more, people are using digital technology, which has opened up new ways for hackers to attack, making cyber security a very important issue. New dangers, like attacks using artificial intelligence and weaknesses in Internet of Things devices, are creating big problems for security experts. This paper looks at the present situation of cyber security threats and the ways we protect against them, and finds where things are missing or where we can do better.

Cyber security threats are harmful actions meant to attack digital resources, which can lead to the loss of secret information, damage to data, and disruption of services. Common threats include:

Phishing is a type of social engineering attack where hackers use emails, text messages, or phone calls to trick people into sharing private or important information.

Ransomware is a type of bad software that locks up files and asks for money in exchange for the code needed to unlock them.

IoT Vulnerabilities: Using weaknesses in Internet of Things devices to get into them without permission.

AI-powered attacks involve using artificial intelligence to carry out complex and focused assaults.

Malware is software that is made to damage or take advantage of computer systems, and it includes things like viruses, Trojans, and spyware.

These threats can lead to:

- Data breaches
- Financial losses
- Disruption of services
- Reputation damage

AI and ML are changing how threats are detected with uses such as:

- Machine learning algorithms look at the data moving through a network to spot unusual activity and warn about possible dangers.
- AI systems check files and code to find and stop any harmful activities.
- Machine learning models watch how users act to spot unusual behavior, which can show if someone inside the company is causing harm or if a user's account has been taken over.
- AI-powered tools find weaknesses in software and systems, helping to decide which issues need fixing first.
- Machine learning algorithms look at emails and messages to find and stop phishing attempts.

These applications enable:

- Faster threat detection
- Improved accuracy
- Enhanced incident response
- Better risk management

History

The idea of keeping personal information private in libraries has grown as technology has improved and people's expectations about protecting their data have changed. Here is a short summary of important developments.

- **Pre Digital Environment of Library:** In the time before digital technology, libraries mainly took care of physical books and handwritten manuscripts. The idea of data privacy wasn't as important as the main goal was to keep customer records and their borrowing history secret. Mostly librarians cared about the privacy of the people who used library services.

- **Introduction of Automated System:** When automated library systems came in the 1970s and 1980s, libraries began moving from keeping records by hand to using computer databases.
- This change made some people worried about the safety and privacy of the information about library users that was now stored on computers.
- **American Library Association (ALA) Guidelines:** The ALA was important in making sure privacy was a key part of library services.

In 1975, the ALA adopted the "code of ethics," which explained how to handle library records. This code laid the foundation for thinking about user privacy in an ethical way.

- **The rise of the Internet and online resources:** In the 20th century, the introduction of the Internet and the digitization of library collections created new challenges and opportunities. Libraries began offering online resources and services, which raised worries about security and the risk of people getting access without permission. To handle this, libraries used digital rights management and access control tools to manage access to e-resources and keep copyrighted material safe. While DRM addressed issues of intellectual property. It also brought up and gathered data about resource usage.

Literature Review

A literature review is the process of looking at and examining scholarly sources like books, articles, journals, and analysis reports related to a specific topic. It involves a detailed look at what has already been studied about a particular subject, in this case, information security and privacy in digital libraries. The buildings and equipment that hold digital information are at risk from many dangers like stealing, breaking, and harmful computer programs such as viruses and other types of malware (Zimmerman, 2009). Hardware, other equipment, and networks — including wireless ones — need to be properly protected to stop people from getting into them or harming the data stored there (Al-Suqri & Afzal, 2007). Regular data backups are also important to protect against losing data, along with other methods of keeping data safe (Anday et al., 2012). Legal and ethical considerations in digital libraries are very important for making sure that digital resources are managed, shared, and used in a responsible way. Here are some important things to think about:

Copyright and Intellectual Property Rights: Digital libraries usually include materials that are protected by copyright. It's important to follow copyright rules and get the right permission before copying and sharing materials that are protected by copyright. Libraries should continue to use the right principles and make sure to give proper credit to the authors and creators. Digital libraries might gather and keep information about users, like what they search for, how they use the library, and any personal details they provide. Libraries need to have strong rules and protections to keep users' privacy safe. They should follow important laws like the General Data Protection Regulation (GDPR) in the European Union or the California Consumer Privacy Act (CCPA) to make sure users' personal information is handled properly and with their

consent. Digital libraries need to be easy for everyone to use, including people who have disabilities. Libraries need to follow accessibility rules like the Web Content Accessibility Guidelines (WCAG) to make sure their online materials can be used by people with different abilities.

Problem Statement

More cyber attacks are happening more often and becoming more advanced, putting at risk the security, accuracy, and accessibility of digital information, which shows why it's important to have strong ways to protect against them.

Objective

- To look into new cyber security dangers and ways to protect against them, figure out good solutions and where more study is needed.

Hypothesis

1. New cyber security dangers are becoming more complex and harder to spot.
2. The existing ways of protecting against threats are not enough to handle the new dangers that are appearing.
3. Using smart tools like artificial intelligence and machine learning can help lower the chances of cyber attacks happening.

Research Methodology

This study employs a mixed-methods approach, combining:

1. Looking at existing research and writings about new cyber security dangers and ways to protect against them.
2. Looking at numbers from trusted sources about cyber attacks.

Key Findings

1. New dangers like phishing, ransomware, and weaknesses in smart devices can cause big problems for digital stuff.
2. The existing security tools, like firewalls and systems that detect intrusions, aren't enough to handle new and growing dangers.
3. Advanced security tools like artificial intelligence and machine learning can help lower the chances of cyber attacks happening.

Conclusion

The research shows how cyber security threats are changing over time and the importance of having strong ways to protect against them. Using smart techniques like artificial intelligence and machine learning can help deal with new and growing dangers.

Future Scope

1. Looking into how new technologies like quantum computing affect cybersecurity.
2. Creating better ways to protect against attacks that use artificial intelligence.
3. Looking at how human elements affect cyber security, like how aware people are and the choices they make.

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Cyber Security Challenges and Preventive Measures in Digital Infrastructure

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Cyber security is now an essential part of today's digital systems, as more governments, companies, and people rely on the internet. The quick expansion of digital platforms, cloud services, online banking, and e-governance has increased efficiency but also widened the risk of cyber threats. This research looks at the main cyber security issues impacting digital infrastructure and evaluates prevention methods that can lower the associated risks. The study is descriptive in nature and relies on secondary data obtained from academic sources, industry reports, and government publications. The results show that technological solutions by themselves are not enough; awareness, policy structures, and on-going supervision are just as crucial. Improving cyber security measures can build confidence, safeguard confidential information, and promote long-term digital development.

Keywords: Cyber Security, Digital Infrastructure, Cyber Threats, Data Protection, Information Security

1. Introduction

Digital infrastructure serves as the foundation of contemporary society. Banking systems, healthcare services, education platforms, transportation networks, and government services now rely heavily on digital technologies. Although this transformation has improved speed, connectivity, and access, it has also made systems more vulnerable to different types of cyber threats.

Cyber security involves safeguarding digital systems, networks, software, and information against unauthorized access, improper use, or cyber threats. With an increasing number of devices linked via the internet, the risk of vulnerabilities grows. Cyber-attacks are no longer confined to big companies; small businesses, educational organizations, and individual users are also frequently targeted.

The expansion of cloud computing, remote work, digital payments, and smart technologies has increased the potential targets for attacks. Therefore, grasping cyber security challenges and putting in place protective steps is crucial for maintaining secure and dependable digital systems.

2. Objectives of the Study

The main objectives of this study are:

- To explain the concept and importance of cyber security
- To identify major cyber security challenges in digital infrastructure
- To examine different types of cyber threats
- To analyze preventive measures used for cyber protection

3. Hypothesis

- **H₀:** Cyber security measures do not significantly reduce risks in digital infrastructure.
- **H₁:** Proper implementation of cyber security measures significantly reduces risks in digital infrastructure.

4. Research Methodology

This research has a descriptive and analytical character. It relies on secondary data gathered from textbooks, research papers, government documents, and cyber security reports. Information from multiple sources was reviewed to gain insight into present cyber threats and the security measures that are currently

available. The research does not collect primary data but instead uses existing literature to offer a structured examination of cyber security issues within digital infrastructure.

5. Importance of Digital Infrastructure

Digital infrastructure comprises computer networks, cloud platforms, servers, databases, internet services, and communication technologies that underpin digital services. It facilitates online banking, electronic governance, digital transactions, e-commerce, and educational platforms.

Since digital infrastructure is highly interconnected, a weakness in one part can impact the whole system. If a company's server is hacked, customer data, financial details, and internal communication systems could all be at risk. Cyber security is essential for ensuring system integrity, confidentiality, and availability.

6. Major Cyber Security Challenges

- **Malware Attacks**

Malware refers to malicious software designed to damage or disrupt systems. It includes viruses, worms, spyware, and ransomware. For example, if a user downloads software from an untrusted website, malicious code can enter the system and damage files or steal information.

- **Phishing**

Phishing is another serious threat. In phishing attacks, users receive fake emails or messages that appear genuine. When users enter their passwords or banking details, attackers capture this information.

- **Data Breaches**

Data breaches occur when confidential information is accessed without authorization. Weak passwords, unsecured databases, and poor network security can lead to data leaks.

- **Denial of Service (DoS) Attacks**

These attacks overload servers with excessive traffic, causing services to become unavailable to legal users.

- **Insider Threats**

Employees or internal users may intentionally or unintentionally cause security incidents by mishandling data or ignoring security protocols.

7. Preventive Measures

- **Encryption**

Encryption converts data into coded form, making it unreadable to unauthorized users.

- **Firewalls and Antivirus Software**

Firewalls monitor incoming and outgoing traffic, while antivirus software detects and removes malicious programs.

- **Multi-Factor Authentication**

Using additional verification methods such as OTPs or biometric authentication increases security.

- **Regular Updates and Patching**

Updating software fixes security vulnerabilities that attackers may exploit.

- **Cyber Awareness Programs**

User education is critical, as many cyber-attacks succeed due to human error. Awareness training helps users recognize suspicious activities.

8. Key Findings

The research highlights that as digital growth continues, so too are the risks posed by cyber threats. Technical tools by themselves are not sufficient; user awareness and the correct implementation of policies are just as crucial. Companies that implement multi-layered security approaches face fewer successful cyber-attacks. Improving cyber security increases confidence in digital services.

The results back up the alternative theory that strong cyber security measures greatly lower risks in digital systems.

9. Conclusion

In the digital age, cyber security is now essential. As digital infrastructure grows, the likelihood of experiencing cyber-attacks rises. Malware, phishing, data breaches, and denial of service attacks are threats that can lead to financial loss, harm to reputation, and interruption of critical services.

Effective preventive measures, such as encryption, authentication mechanisms, routine software updates, and educating users, are essential for safeguarding digital resources. Cyber security depends on a mix of technology, regulations, and users acting responsibly.

Improving secure digital infrastructure will boost confidence in online systems and promote sustained digital progress.

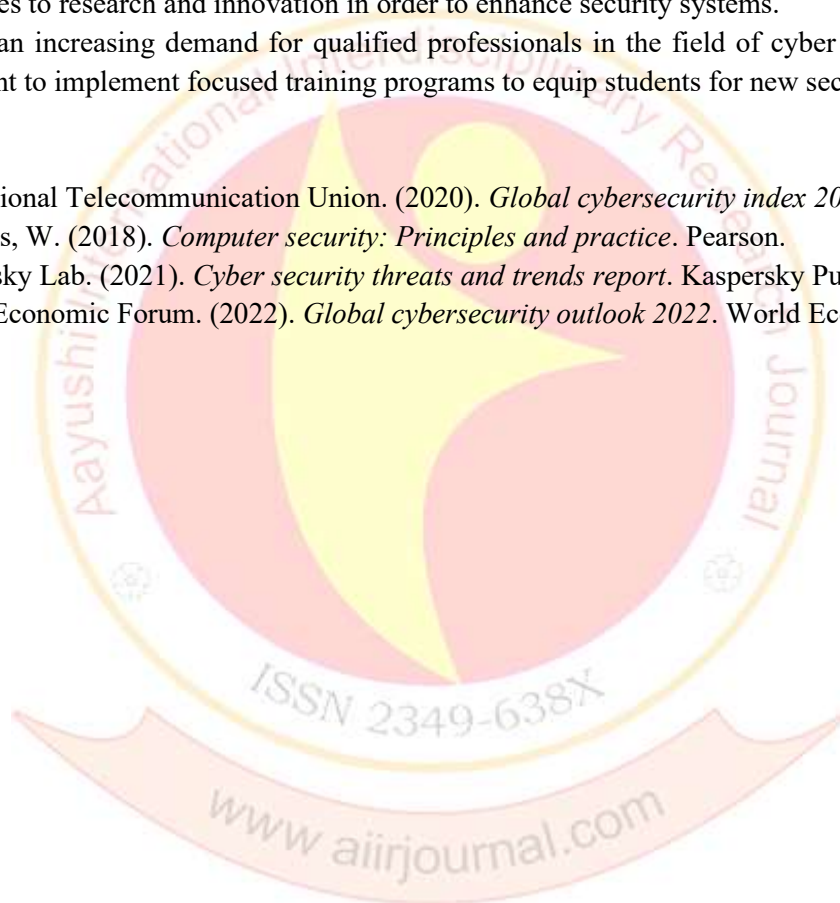
10. Future Scope

The future of cyber security depends on sophisticated technologies like AI-driven threat detection, block chain-based security systems, and automated surveillance tools. Governments and institutions should allocate resources to research and innovation in order to enhance security systems.

There is an increasing demand for qualified professionals in the field of cyber security. Educational institutions ought to implement focused training programs to equip students for new security threats.

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The vision of Viksit Bharat 2047 outlines India's aspiration to become a developed, innovation-driven, and inclusive economy by the centenary of independence. In this national transformation agenda, startups and entrepreneurship development have emerged as critical drivers of structural change, employment generation, and technological advancement. Over the last decade, India's startup ecosystem has expanded rapidly due to digital infrastructure growth, demographic advantages, and supportive government initiatives. This paper examines how entrepreneurship contributes to strengthening India's innovation capacity and long-term development. Using a conceptual research approach based on secondary sources, the study integrates classical entrepreneurship theory, ecosystem perspectives, and policy insights. The findings suggest that innovation-led and inclusive entrepreneurial ecosystems can significantly enhance productivity, competitiveness, and social equity. The paper concludes with strategic recommendations for positioning entrepreneurship as a foundational pillar of Viksit Bharat 2047.

Keywords: Viksit Bharat, Startups, Entrepreneurship Development, Innovation Ecosystem, Inclusive Growth

1. Introduction

India is undergoing a transformative phase marked by rapid digital expansion, demographic dynamism, and increasing global integration. The national vision of Viksit Bharat 2047 reflects a long-term commitment to achieving developed nation status through economic strength, technological leadership, and social inclusion. Achieving this vision requires structural transformation rather than incremental economic progress.

Traditional growth models centered on public-sector enterprises and large-scale industrialization have provided a strong base; however, current global realities demand innovation-driven development. Entrepreneurship has therefore gained renewed importance as a catalyst for economic modernization (Audretsch, 2012).

Startups differ from conventional small businesses because they are innovation-oriented, scalable, and technology-driven (Nambisan, 2017). In India, entrepreneurial activity is no longer confined to metropolitan technology clusters but has expanded into agriculture, healthcare, fintech, education, and renewable energy sectors. This shift demonstrates how startups can address both economic and social challenges simultaneously.

This paper explores the strategic role of startups in strengthening India's innovation capacity and supporting the goals of Viksit Bharat.

2. Conceptual Framework of Entrepreneurship

Entrepreneurship theory has evolved significantly over time. Schumpeter (1934) described entrepreneurs as innovators who disrupt economic equilibrium through creative destruction. According to this view, innovation is the engine of economic growth.

Modern perspectives emphasize the role of entrepreneurial ecosystems—interconnected networks of institutions, finance, policy, and human capital that support venture creation (Stam, 2015). The effectiveness of entrepreneurship depends not only on individual capabilities but also on institutional quality and regulatory frameworks (Estrin et al., 2013).

Research further highlights the relationship between entrepreneurship and economic development. Entrepreneurial capital positively influences regional competitiveness and productivity (Audretsch & Keilbach, 2004). In knowledge-based economies, startups contribute disproportionately to innovation and job creation (Wennekers & Thurik, 1999).

In the Indian context, entrepreneurship must be understood not only as an economic activity but also as a developmental instrument capable of addressing structural inequalities.

3. Startups and Innovation Capacity in India

3.1 Technological Advancement

Technological advancement refers to the continuous, rapid development of tools, systems, and scientific applications—such as AI, biotechnology, and renewable energy—that improve efficiency, productivity, and quality of life. It drives innovation across industries, enabling faster communication, automation, and solutions to global challenges, though it requires responsible management to mitigate risks like the digital divide.

Innovation-driven startups play a central role in technological diffusion. Digital platforms, artificial intelligence solutions, fintech applications, and health-tech innovations are reshaping traditional industries. By introducing new products and processes, startups increase productivity and global competitiveness (Acs et al., 2014).

India's digital transformation has created fertile ground for such innovation. Affordable internet access and digital payment systems have enabled entrepreneurs to scale solutions rapidly across diverse markets.

3.2 Employment Generation

India's demographic dividend presents both an opportunity and a challenge. Millions of youth enter the workforce annually, requiring productive employment avenues. Entrepreneurship offers a viable alternative to traditional salaried employment.

Empirical research suggests that entrepreneurial activity contributes to employment growth and reduces unemployment pressures (Thurik et al., 2008). Startups create direct jobs while also generating indirect employment through supply chains and service linkages.

3.3 Inclusive Growth

Inclusive growth is an economic approach that ensures the benefits of development are shared equitably across all segments of society, rather than being concentrated among a few. It focuses on fostering, broad-based, sustainable growth that creates productive, fairly paid jobs, reduces inequality, and provides universal access to education, healthcare, and infrastructure.

A notable trend in India's startup ecosystem is the emergence of social enterprises focused on rural development, women empowerment, and financial inclusion. Digital entrepreneurship lowers transaction costs and expands access to essential services (Nambisan, 2017).

Such inclusive innovation aligns closely with the objectives of Viksit Bharat by integrating marginalized populations into formal economic processes.

4. Policy Support and Institutional Environment

Government initiatives have significantly influenced India's startup ecosystem. Policy frameworks that reduce regulatory burdens, encourage innovation, and provide financial support have enhanced entrepreneurial participation.

Government policies for Viksit Bharat (Developed India @ 2047) startups focus on Deep tech, innovation, and self-reliance, backed by the approved ₹10,000 crore Startup India Fund of Funds 2.0. Key

initiatives include the ₹1 lakh crore RDI fund, Atal Innovation Mission, Seed Fund Scheme (SISFS), and sector-specific support like iDEX (defense) and India AI Mission.

Entrepreneurial ecosystems thrive when public and private stakeholders collaborate effectively (Isenberg, 2010). Incubation centers, innovation hubs, and skill development programs have strengthened startup capacity.

Entrepreneurship education is equally critical. Integrating innovation and business skills into higher education institutions fosters opportunity recognition and venture creation (Kuratko, 2016).

Despite progress, regional disparities remain evident. Metropolitan cities dominate startup concentration, while smaller towns face infrastructural and funding limitations.

5. Challenges in Entrepreneurship Development

Although India has achieved significant progress, structural barriers persist.

Rural entrepreneurship in India faces significant challenges, primarily driven by poor infrastructure, limited access to capital, and talent shortages. Key hurdles include unreliable electricity, inadequate transportation/internet connectivity, lack of credit/collateral, and a shortage of skilled labour. These factors hinder scaling, marketing, and operational efficiency.

Other challenges include -

- Limited access to early-stage funding outside major cities
- Regulatory complexities and compliance burdens
- Skill gaps in scaling and management
- Limited global market integration

Institutional quality strongly influences entrepreneurial growth aspirations (Estrin et al., 2013). Therefore, strengthening governance frameworks is essential for long-term sustainability

6. Strategic Recommendations for Viksit Bharat 2047

To strengthen entrepreneurship as a pillar of national development, the following measures are recommended:

1. Expand entrepreneurship education across disciplines
2. Promote incubation support in tier-2 and tier-3 cities
3. Improve access to blended finance and credit support
4. Strengthen industry-academia collaboration for research commercialization
5. Encourage sustainable and socially responsible entrepreneurship

A coordinated national innovation strategy integrating digital infrastructure, skill development, and industrial policy is essential for maximizing startup impact.

7. Conclusion

Startups and entrepreneurship development are fundamental to realizing the vision of Viksit Bharat 2047. Drawing from Schumpeter's innovation theory (Schumpeter, 1934) and ecosystem frameworks (Stam, 2015), this study highlights the transformative potential of entrepreneurship in driving economic modernization and inclusive growth.

India's expanding startup ecosystem reflects strong potential; however, sustained institutional support, regional balance, and skill enhancement are necessary for long-term success. By nurturing innovation capacity through entrepreneurship, India can strengthen its path toward becoming a developed and globally competitive nation.

Entrepreneurship, therefore, must be recognized not merely as business creation but as a strategic instrument of national transformation.

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Green Banking in India: Sustainability Implications for the Modern Financial Sector**Dr. R. S. Gavit**

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Email: rajeshgavit1976@gmail.com**Abstract**

Rapid globalization and industrial expansion have intensified environmental concerns, compelling financial institutions to adopt sustainable practices. Green banking represents an emerging paradigm in which banks integrate environmental responsibility into operational strategies, lending policies, and customer services. The concept promotes reduced carbon footprints through digital banking, eco-friendly financial products, and environmentally responsible investment decisions. This paper examines the scope of green banking in India, key products and strategies adopted by banks, and the benefits and challenges associated with implementation. Using secondary data sources, the study analyses how Indian banks are gradually incorporating sustainability principles through green loans, paperless banking, renewable-energy initiatives, and responsible lending frameworks. The findings indicate that although awareness and technological adoption have improved, green banking in India remains at a developing stage compared to global counterparts. Stronger regulatory guidance, stakeholder awareness, and strategic alignment with environmental goals are essential for sustainable banking transformation.

Keywords: Green Banking, Sustainable Finance, Environmental Sustainability, Green Loans, Digital Banking

1. Introduction

Green banking refers to the integration of environmental and social considerations into banking operations and financial decision-making. Financial institutions play a critical role in promoting sustainable development because they influence investment flows and industrial growth. By encouraging eco-friendly projects and reducing operational carbon emissions, banks can contribute to long-term environmental protection [1].

The concept involves both internal and external initiatives. Internally, banks adopt paperless workflows, energy-efficient infrastructure, and digital transactions. Externally, they support environmentally responsible projects through preferential lending and investment policies. While international banks have significantly advanced sustainable finance practices, Indian banks are still evolving within this domain [2].

2. Environmental Sustainability and the Banking Sector

Environmental sustainability gained global prominence following policy initiatives such as the National Environmental Policy Act and international climate agreements. Financial institutions began integrating sustainability into their business models through eco-friendly financial products, responsible investment frameworks, and green customer services.

Examples include:

1. Paperless and mobile banking systems that reduce resource consumption
2. Green credit cards using biodegradable materials
3. Savings accounts linked to environmental donations
4. Digital platforms minimizing physical branch visits and transportation emissions

Such initiatives demonstrate how technological innovation can align financial operations with environmental goals [3].

3. Concept and Scope of Green Banking

Green banking is often described as ethical or sustainable banking because it evaluates environmental and social impacts alongside financial performance. Unlike conventional banking, green banking requires risk assessment frameworks that examine ecological consequences before financing projects.

Key characteristics include:

1. Promotion of online and mobile banking services
2. Reduction in paper-based transactions
3. Encouragement of environmentally responsible investments
4. Adoption of energy-efficient infrastructure

These strategies reduce operational costs while strengthening institutional reputation and stakeholder trust [4].

4. Green Banking Products and Financial Instruments

Green banking encompasses a diverse range of innovative financial products and policy frameworks that enable financial institutions to align their lending activities with environmental sustainability objectives. These instruments are designed not only to reduce the ecological footprint of banking operations but also to channel capital toward environmentally responsible projects and industries. By integrating sustainability criteria into financial decision-making, banks encourage businesses and individuals to adopt cleaner technologies, improve energy efficiency, and contribute to long-term ecological balance. As environmental risk increasingly influences financial stability, green banking products have evolved into strategic tools that support both sustainable development and risk management within the financial sector.

Green Loans represent one of the most significant financial instruments within green banking. These loans are specifically structured to finance projects that deliver measurable environmental benefits, such as renewable energy installations, energy-efficient buildings, waste management systems, and environmentally friendly manufacturing processes. Banks may offer preferential interest rates, flexible repayment terms, or additional incentives to borrowers who demonstrate compliance with environmental standards. By directing credit toward sustainable sectors, green loans help reduce carbon emissions while encouraging technological innovation. Furthermore, they allow banks to diversify their portfolios by investing in industries aligned with global climate goals, thereby reducing long-term environmental and regulatory risks.

Another important product category is Green Mortgages, which are designed to promote energy-efficient housing and sustainable construction practices. Under these schemes, financial institutions provide favorable lending terms—such as lower interest rates, higher loan eligibility, or extended repayment periods—to individuals or developers who invest in eco-friendly buildings. Energy-efficient homes typically incorporate features such as solar panels, improved insulation, rainwater harvesting systems, and smart energy management technologies. By incentivizing sustainable construction, green mortgages not only reduce energy consumption and greenhouse gas emissions but also enhance the long-term financial stability of borrowers through lower utility costs and improved property value.

In addition to specific financial products, green banking relies heavily on Sustainable Finance Guidelines, which provide standardized frameworks for evaluating environmental and social risks associated with lending activities. International principles such as the Equator Principles, ISO 14000 environmental management standards, and environmental and social norms promoted by global financial institutions guide banks in assessing project sustainability and ensuring responsible financing decisions. These frameworks encourage transparency, accountability, and risk mitigation by requiring banks to evaluate environmental impacts before approving loans or investments [5]. By adopting such guidelines, financial institutions strengthen their governance structures and align their operations with global sustainability benchmarks.

Recognition programs and industry initiatives also play a vital role in promoting green banking practices. Awards and benchmarking systems focused on sustainable finance highlight institutions that successfully integrate environmental, social, and governance (ESG) considerations into their business strategies. These recognition mechanisms not only encourage competition among banks to adopt greener

practices but also increase public awareness about sustainable financial products. As ESG integration becomes a key performance indicator in the global financial system, green banking products and financial instruments are expected to expand further, driving innovation and supporting the transition toward a low-carbon economy.

5. Emerging Trends in Green Banking

Green banking initiatives are gaining traction globally as customers and regulators emphasize sustainability. Digital banking platforms significantly reduce carbon emissions by minimizing paper usage and physical infrastructure requirements.

Benefits of digital banking include:

1. Lower operational costs
2. Enhanced customer convenience
3. Improved efficiency and profitability

Studies suggest a positive relationship between environmental performance and financial performance, indicating that sustainability can enhance long-term competitiveness [6].

6. Green Banking Strategies Adopted by Indian Banks

Indian banks have initiated several measures to align with sustainability goals:

1. Solar-powered ATMs and energy-efficient branches
2. Green home loan schemes
3. Clean technology financing programs
4. Mobile and internet banking platforms
5. Corporate environmental stewardship initiatives

The Reserve Bank of India has encouraged green IT practices and CSR-based environmental programs to promote sustainable banking operations [1].

Examples of services contributing to green banking include:

1. Online fund transfers and bill payments
2. E-tax and IPO applications
3. Digital account management and mobile banking transactions

These initiatives reduce environmental impact while enhancing service accessibility.

7. Benefits of Green Banking in India

Green banking provides several economic and environmental advantages to the banking sector and society. One of the key benefits is the reduction in paper consumption, as core banking systems enable electronic reporting, digital communication, and paperless transactions, thereby minimizing deforestation and operational waste. Another important benefit is environmental awareness, where banks collaborate with NGOs and corporate organizations to promote sustainability programs and encourage eco-friendly practices among customers and businesses.

Green banking also promotes preferential lending, as financial institutions provide incentives for projects involving renewable energy, green buildings, and energy-efficient technologies. In addition, it supports improved risk management by incorporating environmental screening into lending decisions, which helps reduce long-term credit risks associated with unsustainable industries. Finally, operational efficiency is enhanced through digitalization, as online and mobile banking services increase productivity, reduce operational costs, and improve overall customer satisfaction.

8. Challenges in Implementing Green Banking

Despite progress, several obstacles remain:

1. Limited customer awareness about green financial products
2. Lack of standardized sustainability metrics

3. High initial investment costs in green infrastructure
4. Need for stronger regulatory frameworks

Indian banks must balance environmental goals with profitability and market competitiveness.

9. Suggestions for Effective Implementation

To accelerate green banking adoption, banks should:

1. Promote digital banking through awareness campaigns
2. Integrate environmental risk assessment into lending policies
3. Offer incentives for eco-friendly projects
4. Reduce energy consumption through green IT infrastructure
5. Collaborate with regulators and environmental organizations

10. Conclusion

Green banking represents a transformative approach that aligns financial growth with environmental sustainability. Although Indian banks have begun adopting digitalization and eco-friendly lending strategies, implementation remains at an early stage compared to global standards. Strengthening regulatory support, enhancing technological adoption, and promoting stakeholder awareness can accelerate the transition toward sustainable banking practices. By integrating environmental considerations into core business strategies, banks can contribute to sustainable economic development while maintaining financial stability.

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Waste Management through the 3R Principle: A Circular Economy Approach**. Dr. Prema Arum Yadav**

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Abstract:

The circular economy has emerged as a sustainable alternative to the traditional linear economic model of “take–make–dispose.” It focuses on minimizing waste, conserving resources, and maintaining the value of products and materials for as long as possible. The core foundation of the circular economy is the 3R principle—Reduce, Reuse, and Recycle. This paper examines the concept of circular economy, explains the importance of the three Rs, discusses their environmental and economic benefits, and highlights implementation challenges and future prospects. The study concludes that adopting 3R strategies is essential for achieving sustainable development and resource efficiency.

Keywords: Circular economy, Reduce, Reuse, Recycle, sustainability, waste management

1. Introduction

Rapid industrialization and population growth have significantly increased resource consumption and waste generation. The traditional linear economy follows a “take–make–dispose” model, which leads to resource depletion and environmental degradation. In response, the circular economy has been proposed as a regenerative system that keeps materials in use for as long as possible. The circular economy is primarily guided by the 3R principles—Reduce, Reuse, and Recycle, which aim to minimize waste and maximize resource efficiency. This research paper explores how these principles support sustainable development

2. Objectives:

1. Minimize Waste Generation.
2. Efficient Use of Resources.
3. Promote Sustainable Production and Consumption.
4. Reduce negative Environmental Impact.
5. Enhance Economic Growth and Innovation.
6. Build Resilient and Self-Sufficient Economies.

3. Hypothesis:

1. If India systematically adopts circular economy principles (reduce, reuse, recycle, repair, and remanufacture), it will achieve higher resource efficiency, lower environmental degradation, and more inclusive economic growth.”
2. Circular economy will strengthen India’s resource self-reliance.
3. Circular systems will significantly improve India’s waste management outcomes.
4. Circular transition will increase employment opportunities in India.
5. Circular economy adoption improves MSME productivity and competitiveness.
6. Circular economy supports India’s climate and sustainability goals.
7. Circular economy improves livability of Indian cities.

4. Data Collection Methodologies:

1. Primary Data: Surveys of households, industries, or MSMEs, Interviews with policymakers, recyclers, and experts. Field observations of waste management systems.

2. Secondary Data: Economic Survey of India. NITI Aayog reports. CPCB and MoEFCC data. World Bank and UNEP reports. Research journals and government publications.

5. Importance of Subject Study:

1. Economic Importance: Beyond "Take-Make-Waste": The traditional Linear Economy follows a Take → Make → Dispose pattern, which is inefficient. The Circular Economy is important because. Decoupling Growth from Resource Use: It allows GDP to grow without requiring a proportional increase in raw material consumption. Cost Savings: By reusing materials, industries reduce their "Input Costs." This is vital for a developing economy like India to remain competitive. Price Stability: It protects the economy from the "Price Volatility" of raw materials (like oil or metals) in the global market.
2. Environmental Importance: Solving the Triple Crisis. The Circular Economy is the primary solution to three global threats. Climate Change: Nearly 45% of global greenhouse gas emissions come from the way we produce and manage products and food. Circularity reduces this footprint. Waste Management: It solves the "Landfill Crisis" by treating waste as a secondary raw material. Biodiversity Loss: By recycling and reusing, we reduce the need for mining and deforestation, preserving natural habitats.
3. Strategic Importance for India (Atmanirbhar Bharat) Resource Security: India imports many critical minerals (e.g., Lithium for EV batteries). Circularity helps "mine" these from old electronics (E-waste) rather than importing them. Job Creation: It creates a massive number of "Green Jobs" in repair, refurbishment, recycling, and waste-to-energy sectors. Rural Economy: Through schemes like GOBAR Dhan, agricultural waste is converted into bio-gas, providing financial stability to farmers.
4. Academic and Research Relevance. As you plan to publish research papers, this topic is a "gold mine": Sustainability Metrics: You can study how circularity improves the Environmental, Social, and Governance (ESG)

6. Explanation:

6.1 Minimize Waste Generation:

Minimizing waste saves resources, reduces management costs, and supports a circular economy. Here is a comprehensive guide to minimizing waste generation, organized for easy implementation.

1. The 5 R's Hierarchy: To effectively reduce waste, follow this priority list: Refuse, Reduce, Reuse, Repurpose, Recycle:
2. Practical Strategies for Daily Life in the Kitchen & Food Management. Plan your weekly meals to avoid overbuying perishable items. Organic waste (food scraps, vegetable peels) accounts for a large portion of household waste. Start a small compost bin to turn waste into nutrient-rich soil. Store food properly to extend its shelf life and prevent spoilage.
Sustainable Shopping: Carry Your Own Kit: Keep a reusable bag, a water bottle, and a steel straw in your backpack. Choose Concentrates: Buy concentrated versions of cleaning products or detergents that use less plastic packaging. Opt for e-bills, digital newspapers, and soft copies of academic papers unless a hard copy is strictly necessary.
3. Waste Management in an Academic Context

6.2 Efficient Use of Resources:

1. The Core Concept: "Doing More with Less" Resource efficiency isn't just about saving the environment; it's about Optimization.
 - A. Natural Resources: Water Conservation: Use low-flow fixtures and harvest rainwater. In a campus setting, reporting leaks immediately prevents massive cumulative waste.
Energy Efficiency: Switch to LED lighting and use Bureau of Energy Efficiency (BEE) star-rated appliances. Always unplug electronics when not in use to avoid "phantom" power consumption.

Circular Materials: Instead of a "Take-Make-Dispose" model, adopt a Circular Model where products are designed to be refurbished or recycled back into the production cycle.

B. Personal & Academic Resource:

Time Management: As a student balancing MA studies and research paper publication, time is your scarcest resource. Use techniques like the Pomodoro Method or Time Blocking to ensure high-intensity focus.

Digital Efficiency: Use cloud storage (Google Drive/OneDrive) to organize your research. This reduces the need for physical paper, saves physical space, and makes information retrieval instant.

2. Economic Frameworks for Resource Efficient:

As an Economics major, you can apply these theories to your future research:

6.3 Promote Sustainable Production and Consumption:

Sustainable production and consumption (SDG 12) is about "decoupling" economic growth from environmental degradation. Promoting these practices is essential for your goal of becoming a distinguished professor, as sustainability is a top-tier research priority globally.

1. Promoting Sustainable Production (The Supply Side): This focuses on how industries and businesses can produce goods more efficiently.

- **Eco-Design:** Encouraging industries to design products that are durable, repairable, and easy to recycle.
- **Green Supply Chains:** Promoting the use of raw materials that are ethically sourced and have a low carbon footprint.
- **Waste Valorization:** Transforming manufacturing by-products into secondary raw materials (e.g., using fly ash from power plants in cement production).
- **Internalizing Externalities:** Using economic policies (like Carbon Taxes) to ensure producers pay for the environmental damage they cause, incentivizing cleaner methods.

2. Promoting Sustainable Consumption (The Demand Side): This focuses on how we, as consumers, can change our behavior to reduce our ecological footprint.

- **The Sharing Economy:** Moving from "ownership" to "access." Using public transport, libraries, or co-working spaces reduces the total number of goods needed.
- **Mindful Purchasing:** Choosing products with Ecolabels (like India's "Ecomark") which certify that a product is environmentally friendly.
- **Energy & Water Efficiency:** Adopting habits like using star-rated appliances and reducing water wastage in daily chores.
- **Dietary Shifts:** Reducing the consumption of resource-intensive foods (like processed meats) in favor of local, seasonal, and plant-based options.

6.4 . Reduce negative Environmental Impact:

To transition to a Circular Economy, we must move away from the traditional "Linear Model" (Take-Make-Dispose) which depletes resources and creates pollution. Reducing negative environmental impacts requires a systemic change in how we design, produce, and consume.

1. Strategies to Reduce Negative Impact: To minimize the "Ecological Footprint," the Circular Economy focuses on three main pillars.

A. Designing Out Waste and Pollution:

- **Eco-conception:** Products should be designed for durability and disassembly. If a phone battery dies, you should be able to replace it rather than throwing the whole phone away.
- **Hazardous Substance Substitution:** Replacing toxic chemicals in manufacturing (like lead or mercury) with organic or biodegradable alternatives to prevent soil and water contamination.

B. Keeping Products and Materials in Use: Refurbishment & Remanufacturing: Instead of manufacturing from scratch, companies can take back old products, repair them to "as-new" condition, and resell them. The "Product-as-a-Service" Model: Instead of buying a car or a printer, you pay for the service (miles driven or pages printed). The manufacturer retains ownership and is incentivized to make the product last as long as possible.

C. Regenerating Natural Systems: Bio-mimicry: Returning biological nutrients (like food waste or wood) safely to the soil to support new growth.

- Renewable Energy: Shifting the entire production cycle to solar, wind, or hydro power to eliminate carbon emissions.

2. Economic Benefits for India:

Since you aim to be a Distinguished Professor, understanding the macro-economic impact is vital.

6.5 Enhance Economic Growth and Innovation:

In a traditional "Linear Economy," growth is tied to resource depletion (Growth \propto Resource Use). In a Circular Economy, we "decouple" these, allowing the economy to grow while the environmental footprint shrinks.

1. How the Circular Economy Drives Economic Growth: The transition from a "Take-Make-Waste" model to a circular one stimulates the economy in three major ways:
 - Cost Savings on Inputs: By reusing materials (like metals, plastics, and water), industries reduce their dependence on volatile raw material markets. This improves the Profit Margins of firms.
 - New Revenue Streams: Waste from one process becomes the "feedstock" for another. For example, agricultural waste in Kolhapur can be converted into Bio-gas or Bio-plastics, creating entirely new industries.
 - Job Creation: Circular models are more labor-intensive than resource-intensive. Activities like Remanufacturing, Repairing, and Recycling require skilled labor, leading to higher employment rates compared to highly automated extraction industries.
2. The Role of Innovation: Innovation is the engine that makes circularity possible. As a researcher, you can focus on these three types:
 - A. Design Innovation: Developing products that are meant to be taken apart (Design for Disassembly). If a component fails, only that part is replaced, not the whole machine.
 - B. Business Model Innovation: Product as a Service (PaaS): Instead of selling a physical product, companies sell the result. Apps that allow for the collective use of underutilized assets (cars, tools, office spaces).
 - C. Technological Innovation: Digital Product Passports: Using Blockchain to track a product's lifecycle, making it easier to recycle specific components. 3D Printing: Reducing material waste by printing only what is needed (Additive Manufacturing).

6.6 Build Resilient and Self-Sufficient Economic:

Resilience is the ability of an economy to absorb shocks (like pandemics or climate disasters) and recover quickly.

1. Pillars of Economic Resilience: A resilient economy doesn't just grow; it survives and thrives under pressure.
 1. Diversification of Production: Moving away from a single-commodity or single-sector economy. If one sector (like Tourism) fails, others (like Manufacturing or Agriculture) keep the economy afloat.
 2. Robust Financial Systems: Building strong local credit institutions and cooperative banks (like those in Western Maharashtra) ensures that small businesses can access capital during crises.
 3. Infrastructure for Recovery: Investing in "Green Infrastructure"—renewable energy grids, disaster-resistant transport, and digital connectivity—to ensure minimal disruption.

2. Strategies for a Self-Sufficient Economy: Self-sufficiency (Autarky in its extreme, but "Strategic Autonomy" in a modern sense) reduces dependency on volatile global supply chains.

A. Localizing Supply Chains (Vocal for Local): Import Substitution: Encouraging local industries to produce goods that are currently imported. This saves foreign exchange and creates local jobs. Instead of massive factories in one city, promoting MSMEs (Micro, Small, and Medium Enterprises) across rural areas like Wai or Kolhapur.

B. Energy and Food Security: Renewable Energy Independence: Shifting to solar and wind power so the economy isn't at the mercy of global oil and gas price hikes.

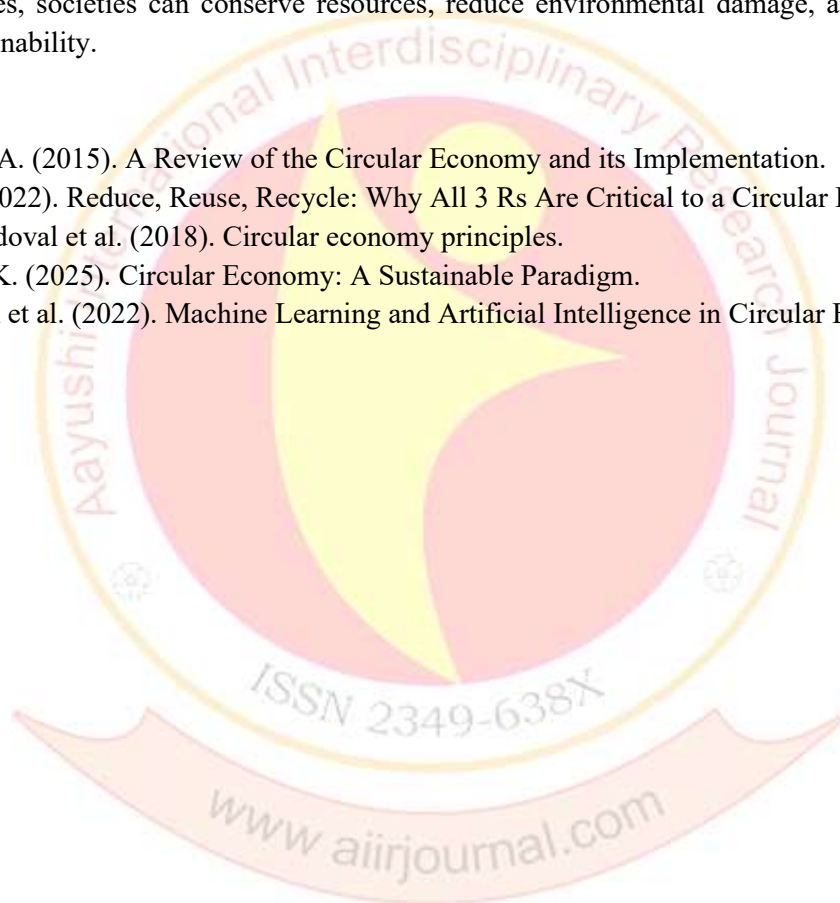
Sustainable Agriculture: Promoting organic farming and local seed banks. This ensures that the food supply is not dependent on expensive, imported chemical fertilizers.

7. Conclusion:

The circular economy offers a practical pathway toward sustainable development by replacing the linear "take–make–dispose" model. The 3R principles—Reduce, Reuse, and Recycle—form the backbone of this approach. Among them, reduction is the most effective strategy, followed by reuse and recycling. Successful implementation requires coordinated efforts from governments, industries, and consumers. By adopting circular practices, societies can conserve resources, reduce environmental damage, and achieve long-term economic sustainability.

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Abstract

In the categories of agricultural GDP, rural employment, and foreign exchange earnings, India is the world's top producer, consumer, and exporter of spices. However, growing input costs, a lack of water, soil degradation, and climate change represent increasing challenges to the cultivation of spices. In this regard, green finance has emerged as a key tool over enhancing climate-resilient and environmentally responsible agriculture practices. With significant reference to institutional mechanisms run by agencies like the National Bank for Agriculture and Rural Development (NABARD), commercial banks, and climate finance partnerships, the present piece investigates the role of green finance in improving sustainable spices agricultural practices in India. The research study investigates an assortment of green finance tools, such as carbon financing initiatives, climate funds, concessional credit, and sustainable agricultural finance models. The research investigation assesses how green finance stimulates the use of drip irrigation, renewable energy, organic inputs, and climate-smart cultivation methods in the farming and processing of spices using secondary data sources and policy papers. On the basis of the findings, specific green finance mechanisms might enhance farmers' income stability, increase productivity, lower environmental risks, and improve resource-use efficiency. The study arrives to the judgment that in addition to achieve long-term sustainability in India's spice manufacturing sector, green finance must be seamlessly incorporated with institutional reforms and farmer awareness programmers.

Introduction

The fundamental principle of the Indian economy continues to include agriculture, and the spices business maintains an exceptional position within it due to its high value, potential for export, and capability to create jobs. India distributes goods such cardamom, cumin, turmeric, chilli, and pepper to foreign markets, contributing up an important percentage of the worldwide spice manufacturing and exports. Organization like the Spices Board of India has served as essential in fostering growth of imports and production. Despite its economic statistical significance, manufacturing spices presents an abundance of sustainability difficulties. Production risk factors are now higher due to climate unpredictability, erratic rainfall patterns, extreme temperature variability, pest outbreaks, deteriorating soil fertility, and exploitation of chemical inputs. India participates extensively to the international manufacture and export of spices by distributing products like cardamom, cumin, turmeric, chilli, and pepper to worldwide markets. The proliferation of imports and production are both significantly supported by associations like as the Spices Board of India. The concept of "green finance" has been growing in popularity in recent years as a means of allocating resources to development that's environmentally sustainable. Financial investments that support biodiversity conservation, climate adaptation, mitigation, and sustainable resource management are sometimes referred to as "green finance." Investments in drip irrigation systems, solar-powered pumps, organic farming inputs, integrated pest management, and carbon sequestration procedures are all facilitated through green finance in the agricultural market. Through its Climate Strategy 2030, Green Impact Fund, and funding for carbon partnerships, the National Bank for Agriculture and Rural Development (NABARD) has taken substantial measures toward advancing climate-resilient agriculture. Likewise, collaborations with international groups

like the Food and Agriculture Organization (FAO) seek to improve sophisticated carbon financing techniques in Indian agribusiness. By investigating the institutional framework, the financial instruments, and regulation mechanisms that can improve sustainability in the cultivation and manufacturing of spices, this paper attempts to fill this research gap.

What is Green finance?

Financial solutions and assistance that are focused on advancing environmental sustainability are sometimes referred to as "green finance." Financing renewable energy projects, enhancing energy efficiency, encouraging sustainable agriculture, minimizing pollution, managing water resources, protecting biodiversity, and supporting activities for climate adaptation and mitigation among merely some of the many tasks it involves.

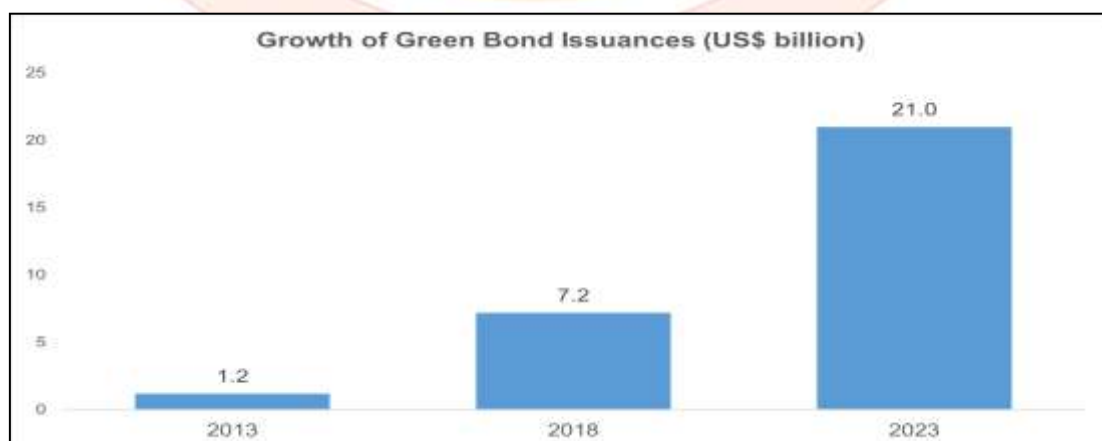
The categories into and these Green Finance can be segmented are following:

1. **Green bonds** are financial products that have been created specifically for sustaining projects that are environmentally friendly.
2. **Green loans:** Green loans are those that are who promote an excellent environmental impact or are intended for sustainable, environmentally conscious goals like eliminating CO2 emissions.
3. **Green insurance:** Signifies insurance plans that have the main objective to reduce environmental hazards and guarantee the continued growth of sustainable practices.
4. **Carbon markets and credits:** Carbon credits are traded on financial markets, allowing companies to offset their emissions.
5. **Sustainable investments fund:** Investment vehicles that integrate Environmental, Social, and Governance (ESG) concerns into their decision-making process are referred to as sustainable investment funds.

Green finance's emergence in India:

Sustainability has developed into more important to India, particularly within the light of its commitments to global agreements like the Paris Agreement. India has committed to reducing its carbon intensity by 33–35% from 2005 levels by 2030 in accordance of the Paris Agreement. Along with other ambitious targets pertaining to carbon reduction, sustainable agriculture, and green energy subsequent ones, the nation also intends to source 50% of its electricity from renewable sources by 2030. On the basis of estimates, India would require US\$ 170 billion (or approximately Rs. 11 lakh crore) a year, or US\$ 2.5 trillion (roughly Rs. 162.5 lakh crore), between 2015 and 2030 with the goal to pay off its Nationally Determined Contributions (NDCs) under the Paris Agreement. Given the context of these targets, financing has been a major concern. Due to their emphasis on immediate financial gain, traditional funding sources are frequently falling short of supporting the significant expenditures needed for environmentally conscious endeavors. Green finance, which provides long-term, patient capital in line with environmental goals, originated as the consequence of this gap.

Green Bonds Issuances:



Sources : (<https://www.ibef.org>)

Within the course of the past ten years, India has seen an upsurge in the issue of green bonds. Between 2013 and 2023, issuances are growing from US\$1.2 billion (or about Rs. 1,000 crore) to US\$21.0 billion (roughly Rs. 1.7 lakh crore). Favorable government policies and the focus on transition to a sustainable economy encouraged these issuances.

Role of Green finances in Spices crop cultivation in India:

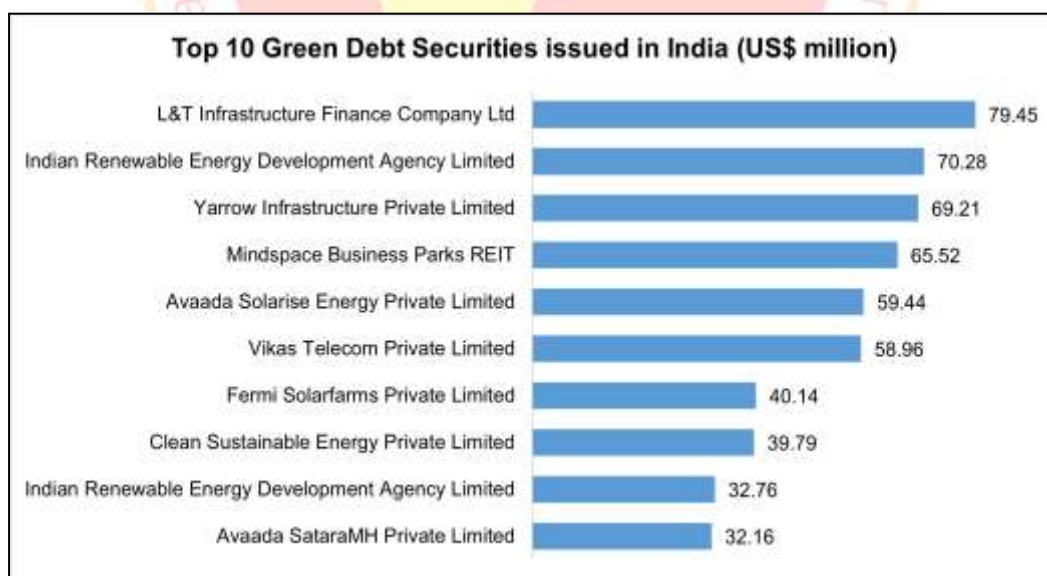
Green finance, that finances eco-friendly technologies, micro-irrigation (PDMC), and organic farming (PKVY), enables Indian spice grower's transition to sustainable, climate-resilient methods. Through programs like the Sustainable Spices Initiative-India, it fosters high-quality; traceable production, increases exports, and improves income for smallholder farmers.

In India's spice industry, environmentally friendly financing plays important functions such as:

1. **Encouragement of Organic Farming:** Paramparagat Krishi Vikas Yojana (PKVY) supporting initiatives support organic spices (turmeric, ginger, and cumin), lowering consumption on chemicals while improving soil health.
2. **Climate Resilient Infrastructure:** Green finance helps farmers adapt to climate change, cut waste, and boost yields (e.g., in chilli production) by funding water management projects including building ponds.
3. **Adoption and Modernization of Technology:** Investments support digital technologies for yield forecasts and disease detection, as well as drip/sprinkler irrigation (Per Drop More Crop), which improves resource efficiency.
4. **Quality & Market Access:** In order to accomplish worldwide standards for food safety and obtain higher pricing in export markets, financing helps ensure adherence to Good Agricultural Practices (GAP) and certifications.
5. **Empowerment of Smallholders:** Initiatives help marginal and tribal farmers in using environmentally friendly farming techniques, increasing their revenue and lowering poverty.

The Spices Board's initiatives and other NABARD agricultural schemes, that supply loans for sustainable agriculture and infrastructure, are important financial initiatives complementing with these endeavors.

Green Debt Securities in India:



Sources: ([SEBI])(<https://www.ibef.org>)

Sustainable spices crop cultivation:

The concept of "sustainable spices crop cultivation" emphasizes the execution of environmentally sensitive, economically viable, and environmentally sustainable farming techniques to produce spices like cardamom, pepper, turmeric, and chilli. While promising sustainable yield and farmer income, it aspires to

maintain long-term soil fertility, conserve water resources, limit minimize chemical inputs, and retain biodiversity. Crop rotation, integrated pest management (IPM), biofertilizers, organic farming, and successful methods for irrigation like drip irrigation have been advocated by this kind of approach. Sustainable spice agriculture strengthens atmospheric resilience, export quality, and long-term profitability by eliminating environmental degradation and maximizing resource efficiency. As a result, it secures that spices are produced in an environment that exceeds the present needs without damaging the willingness of future generations to grow these irreplaceable valuables.

Status of Spices crop cultivation in India:

One of the world's biggest producers, importers, and users of spices is India. Major spices grown in the country's capital various agro climatic zones include cardamom, turmeric, chilli, cumin, coriander, and black pepper. Leading producers of spices include Andhra Pradesh, Telangana, Rajasthan, Gujarat, Kerala, Karnataka, and Tamil Nadu. Due to growing local and foreign demand, the area and output of spices have expanded all throughout time. Since India market spices to more than 150 nations, the industry plays a significant role in this nation's agricultural export economy. Spices are high-value crops that give small and marginal farmers more chances to make money. Though India has tremendous amounts of potential for production and export, the sector faces difficulties such soil degradation, problems with pests, price instability, climate change, and high prices for supplies. As a result, long-term growth depends upon promoting sustainability and climate resilience.

Green Finance Initiatives in Indian Agriculture:

Administrative Structure

A network of financial institutions, development organizations, and regulatory bodies that create, carry out, and oversee sustainable financing initiatives make up the institutional framework for green finance in Indian agriculture. By incorporating agriculture within Priority Sector Lending (PSL), the Reserve Bank of India (RBI) plays a significant role at the regulatory level. A specific percentage of bank loans must go to agriculture, and within this framework, more and more sustainability-related activities are being promoted. One of the key organizations advancing green finance is the National Bank for

Agriculture and Rural Development (NABARD). All things considered, the institutional framework makes sure that farmers, financial institutions, regulators, and policymakers work together in order to promote ecologically sound agricultural development through organized financial assistance.

Government Projects to Promote Green Finance

Through a number of programs that encourage ecologically friendly farming methods, the Indian government supports green finance in the agricultural sector. Programmers like the National Mission for Sustainable Agriculture (NMSA) promote soil health management and climate-resilient farming. Organic farming is recommended by the Paramparagat Krishi Vikas Yojana (PKVY), which offers financial support for organic certification and inputs. Drip irrigation and other micro-irrigation techniques are supported by the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) to increase water efficiency. Similarly, by providing payments for solar pumps, the PM-KUSUM program encourages the use of solar energy in agriculture.

Role of International and Multilateral Agencies

Green finance in Indian agriculture is supported by international and multilateral organizations that offer financial aid, knowledge of technology, and suggestions for policies. Projects pertaining to climate-resilient agriculture, water conservation, sustainable land management, and rural development are provided by organizations including the World Bank, IFAD, Asian Development Bank (ADB), Green Climate Fund (GCF), and FAO These organizations support sustainable farming technologies, build institutional capacity, and mobilize climate funds. Their assistance boosts long-term productivity and export competitiveness in the spices industry by encouraging climate-smart farming, better infrastructure, and ecologically friendly production methods.

These programs promote green finance and encourage sustainable agricultural development, notably in the spice industry by combining financial support with environmental goals.

Green Finance's Contribution to Sustainable Spice Production:

1. Supporting Organic Spice Production

Loans and subsidies for organic inputs, certification, and training are offered by green finance. This enables farmers to produce turmeric, chilli, pepper, and other spices organically rather than using chemicals.

2. Encouragement of Climate-Resilient Technology

Financial support lowers climate risks for spices crops by facilitating the implementation of climate-smart agricultural techniques, protected cultivation, and drought-resistant cultivars.

3. Promoting Water-Efficient Irrigation Activities

Drip and sprinkler irrigation systems, which increase water-use efficiency in water-sensitive spice crops like turmeric and chilli, are supported by green credit.

4. Improvement in Dependency on Chemical Inputs

the overuse of synthetic fertilizers and pesticides is reduced by funding for sanitation facilities, biofertilizers, and integrated pest management (IPM.)

5. Employing Renewable Energy

In the production of spices, financial support for solar pumps and renewable energy systems lowers energy costs and carbon emissions.

6. More Effective Administration of Soil Health –

To ensure long-term soil fertility, environmentally friendly funding supports organic manure application, soil testing, and sustainable land management techniques.

7. Productivity and Quality

Improvement having access to sustainable technologies increases export-quality output and yield stability, especially in terms of high-value spices.

8. Stability and Profitability of Income

Farmers can earn higher prices for organic and residue-free spices thanks to sustainable practices, which also lower long-term input costs.

9. Increasing Export Competitiveness

Production that complies with environmental regulations is more likely to be accepted in global markets with strong quality and residue demands.

Numerous complications in implementing green finance for spice crops:

1. Farmers' Lack of Awareness

Participation is limited since many spice growers are aware of green finance programs, incentives, and sustainable agriculture technology.

3. Restricted Institutional Credit Access

Lack of formal documentation, credit history, or collateral makes it difficult for small and marginal farmers to get bank loans.

5. Large Initial Investment Cost

the high initial cost of sustainable solutions like organic certification, solar pumps, and drip irrigation deters adoption.

7. Expensive Loan Requirements

Farmers may face obstacles as a result of the drawn-out approval procedures, documentation needs, and compliance requirements associated with green finance schemes.

9. Absence of Green Financial Products Customized to Specific Crops –

the vast majority of green finance programs do not apply to spice crops; rather, they are generic agricultural plans.

11. Monitoring and Assessment Challenges

12. It is technically difficult to measure environmental results like lower carbon emissions or better soil health.

13. Spices Market Price Volatility

14. Farmers are reluctant to invest in sustainable methods as a result of the unstable revenue stability resulting from fluctuating prices for spices like pepper and chilli.

15. Limited Technical Knowledge

16. Even with funding available, farmers may not have the necessary training and technical direction to successfully adopt sustainable methods.

17. The risk of Losses during Transition

18. Yields may quickly drop during the transition from conventional to organic farming, which would impact farmer revenue.

19. Gaps in Institutional Coordination

20. Delays in the efficient implementation of green finance can happen from a lack of partnership among government departments, banks, and agricultural agencies.

Green Finance Initiatives Relevant to Sustainable Spices cultivation in India

Initiative/ Scheme	Responsible Agency/Partner	Type of Support	Relevance to spices Sector
Climate Strategy 2030	NABARD	Policy & financing road-map for climate resilience	Promotes green lending frameworks for sustain
NABARD Green Impact Fund (₹1000 Cr)	NABARD	Low-cost finance for climate adaptation projects	Helps finance sustainable crops including spices
NABARD Carbon Fund (₹ 300)	NABARD	Carbon-focused investments	Incentivizes carbon sequestration in farm systems including agro forestry with spices
NABARD-FAO carbon Finance Collaboration	NABARD + FAO	Innovative carbon financing, pilot carbon credit models	Can reward sustainable practices in perennial spice crops and trees
NABARD-CEEW for Climate-Resilient Agriculture	NABARD + CEEW	Policy, research & green finance models	Supports climate-smart farming practices relevant to spices
KISAN Credit Cars (Green Use)	Commercial Banks/NABARD	Agricultural credit with term loans for climate-smart tech	Supports purchase of drip irrigation/renewable energy equipment for spices

Sources: (National Bank for Agriculture and Rural Development)

While many green finance mechanisms are still still at their adolescence and occasionally refrain from breaking down by crop, those that do present valuable financing, policy, and institutional support that traders of spices might employ to implement environmentally friendly procedures.

Implications for Policy and Innovation:**1. Establish Crop-Specific Green Finance Regulations**

Green credit programs should be created by policymakers especially for spices like cardamom, pepper, chilli, and turmeric. Spices are high-value, export-oriented crops, thus their particular production cycles, risk issues and market demands can be met by specific loans.

2. Improve Small and Marginal Farmers' Financial Inclusion

Smallholders make up the majority of spice growers. Their access to sustainable financing may be enhanced by streamlining loan processes, growing Kisan Credit Cards (KCC), and to promote collateral-free green loans.

3. Increase Sustainable Technology Subsidies

Drip irrigation, solar pumps, organic certification, and bio-input producing facilities should all receive larger capital subsidies. The burden of large initial investment expenses will be lessened as a result.

4. Strengthen Extension Services and Capacity Building

It suggests that the Spices Board, Krishi Vigyan Kendras (KVKs), and agricultural institutions upgrade their training programs in integrated pest management (IPM), soil health management, and climate-smart agriculture.

5. Promote Coordination across Institutions

to make certain the seamless flow of green finance with effective oversight, there needs to be more collaboration between the RBI, NABARD, Ministry of Agriculture, commercial banks, and the Spices Board.

6. Farmer Producer Organizations (FPOs) should be promoted

Forming FPOs with spice creators can boost group marketing, lower transaction costs, and increase access to green finance.

7. Present Insurance Assistance and Risk Management

to lower the risks associated with climate variability and market price changes, green finance should be integrated with crop insurance programs and price adjustment techniques.

8. Implement Mechanisms for Monitoring and Evaluation

Create objective sustainability metrics (carbon reduction, water efficiency, and soil quality) to evaluate the success of green financing initiatives in the production of spices.

9. Develop collaborative efforts or public-private partnerships

working together, government organizations, banks, exporters, and private businesses can encourage value chains for sustainable spices and drive in more green investment.

Conclusion

A powerful instrument for supporting sustainable spice crop development in India is green finance. A feasible route to long-term resilience and productivity has been provided by environmentally aligned funding structures, as the spices business meets continuing challenges from resource degradation, climate change, and market volatility. Support from institutions like the Spices Board of India and institutional attempts spearheaded by the National Bank for Agriculture and Rural Development demonstrate growing policy commitment to climate-resilient

Agriculture. By doing facilitating the process of investments in carbon-smart techniques, organic inputs, drip irrigation, and renewable energy, green finance improves farmers' income stability, diminishes production risks, and optimizes resource efficiency. However, increased farmer awareness, crop-specific finance products specialized for the spices marketplace, and increased institutional coordination are all needed for fully maximizing its potential. Products developed specifically for the spice business. In conclusion, connecting green finance with sustainable cultivation techniques is necessary for assuring the economic sustainability, environmental sustainability, and international competitiveness of India's spices economy.

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A Study on Impact of Secondary Sector on Economic Development in India**Dr. Mehtre Nilesh Madhukar**

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Introduction:

The secondary sector, which includes manufacturing, construction and utilities, is crucial for India's economic growth by 2026, contributing 28-30% to GDP. It converts raw materials into finished goods, which in turn drives industrialization, employment, rural development, foreign exchange earnings and exports. Key initiatives such as “Make in India” and “Green Economy” principles focus on sustainable manufacturing and high-value-added production.

In economics, the secondary sector is the economic sector that involves production, including industries that produce finished, usable goods or engage in construction, etc. Manufacturing is an important activity in driving economic growth and development. Nations that export manufactured goods generate high marginal GDP growth, which supports higher incomes and thus the marginal tax revenue needed for government spending such as healthcare and infrastructure.

Industrial activity is expected to gain momentum in 2026, with the industrial sector estimated to grow by 6.2% in 2025, up from 5.9% in 2025. The sector registered a growth of 7.0% in the first half of FY26, higher than the growth of 6.1% in the first half of 2025 and the pre-COVID trend of 5.2%.

Manufacturing has emerged as a key growth engine, with GVA growth accelerating to 7.72% in Q1 and 9.13% in Q2 2026, indicating structural recovery. Till September 2025, government-led initiatives, particularly the Production Linked Incentive (PLI) schemes in 14 sectors, have played a catalytic role in attracting over Rs 2.0 lakh crore of direct investment, generating over Rs 18.7 lakh crore of incremental output/sales and creating over 12.6 lakh jobs.

India's innovation ecosystem has also strengthened, with the country's Global Innovation Index rising to 38th in 2025, up from 66th in 2019, reinforcing the role of manufacturing-led innovation in long-term growth.

1.1: Review of Literature

Manish Kumar (2024) he focus on Industrial development plays a key role in reducing poverty and enhancing shared prosperity by improving employment generation, income and economic efficiency. In Jharkhand, the industrial sector has been a driver of expansion, particularly in the manufacturing sector. During 2019-20, the industrial sector contributed about 42% to the state's Gross State Value Added (GSVA), maintaining a stable share of about 41-42% over the past five years. Jharkhand's economy grew at a CAGR of 5.9% between 2011-12 and 2018-19, with higher growth in the latter years. Overall, the state's economic development is closely linked to industrialization, which supports GDP growth and employment generation.

Balkrishna Subedi (2018) He explains Nepal's industrial development is still in its early stages and faces significant challenges as a least developed country. The economy is heavily dependent on imports, with exports accounting for only 7.1% of total trade, reflecting weak industrial production and export performance. To boost export growth, import substitution and employment generation, Nepal needs to build a strong industrial base based on sustainable development. Industrial development is essential for economic growth, value addition and the status of a developing and middle-income country. By utilizing labor-intensive production techniques and domestic resources, Nepal can create more jobs and achieve high, sustainable and economic growth.

Sunil Mani (1995) studied the performance of the industrial sector during the period of economic liberalization. He clearly highlighted three components of the economic process: (a) policies affecting the structure of the industrial sector; (b) privatization policy; and (c) foreign investment policy.

Sanjukta Mitra (2000) observed that over the last two decades, the share of the secondary sector in India's total output has not shown any improvement. Compared to other developing countries studied by the World Bank, India lags behind in its contribution to the economy in terms of manufacturing output. Neighboring countries such as Bangladesh, Pakistan and Sri Lanka also recorded higher output shares than India. One of the major reasons for this is the inability of the sector to effectively utilize economies of scale.

1.2 Research Problem

The research problem on economic growth and secondary sector in India focuses on understanding why, despite policy initiatives, manufacturing and industrial sectors have not contributed as much to industry GVA and GDP growth as expected. For this, the data of the last ten years will be studied.

1.3 Research Question:

To address the objectives of the study, the following research questions are posed. These questions are related to one of the most important aspects of the study, namely the impact of economic growth and the key determinant industry GVA of economic growth in India last 10 years.

1.4 Objective:

To analyze the Industry GVA that has been the major determinants of economic growth in India over the last ten years.

1.5 Formulation of Hypotheses:

H₀: There is no significant relationship between the growth of the industry GVA and economic development.

H₁: There is a significant positive relationship between the growth of the industry GVA and economic.

1.6 Research Methods:

The nature of the study necessitates the adoption of quantitative and descriptive research designs. Descriptive research, also known as statistical research, describes the data and characteristics related to the population or phenomenon being studied. The role of key determinants of economic growth during the period 2015 to 2025 has been analyzed through appropriate econometric models. The study uses various statistical tools to find answers to the research questions raised.

1.6.1 Selection of Time Period:

The study period is from 2015 to 2025 to understand the role of the secondary sector in India's development.

1.6.2. Data Collection:

The study has been based on secondary data obtained from RBI and has been used to understand the impact and role of secondary sector in economic development in India. Graphical methods are used to understand the changes in economic growth of the secondary sector during the study period. Regression techniques are used to understand the role of the secondary sector in the context of GDP growth.

1.6.3 Data Analysis:

The methodology for analyzing the objectives of the study is presented in detail. It analyzes the trends and impact of the major determinants of economic growth in India over the past 10 years. The impact of secondary determinants of economic growth is examined. A systematic analysis is made based on the objectives and the research questions rose in their context.

1.7 Significance of the Study:

The significance of this study is to identify the key factors in the secondary sector that affect India's economic growth. It helps in understanding how manufacturing and industrial activities contribute to GDP and employment generation. The study is based on secondary data to improve industrial performance and productivity. It will help policymakers in formulating effective policies to strengthen the secondary sector. Overall, it contributes to achieving sustainable and inclusive economic growth in India.

1.8 Overview of the Study:

Industrial development is often used as a basis for national development. Today, no nation can afford to delay industrialization due to the need for rapid economic growth. Therefore, industrialization plays a vital role in achieving the primary objectives of accelerating economic growth and eliminating poverty from the economy.

Therefore, the trend of economic growth and the impact of the industrial sector on the economy are as follows:

Table No-1: Trend of GDP & Industry GVA in India from 2015 to 2025

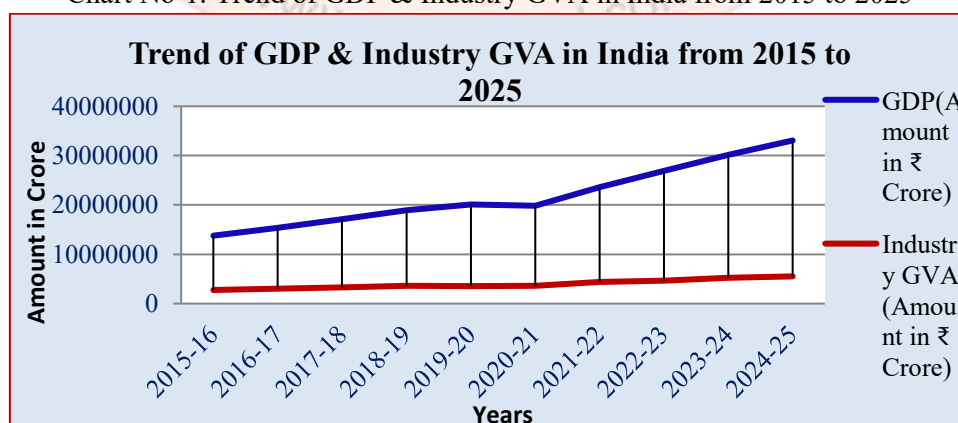
Sr. No.	Year	GDP (Amount in ₹ Crore)	GDP AGR	Industry GVA (Amount in ₹ Crore)	Industry GVA AGR
1	2015-16	13771874	---	2754326	---
2	2016-17	15362386	12%	3025648	10%
3	2017-18	17095005	11%	3292694	9%
4	2018-19	18899668	11%	3639680	11%
5	2019-20	20103593	6%	3565101	-2%
6	2020-21	19854096	-1%	3628414	2%
7	2021-22	23597399	19%	4409737	22%
8	2022-23	26890473	14%	4654616	6%
9	2023-24	30122956	12%	5220374	12%
10	2024-25	33068145	10%	5517181	6%
		CAGR	10%	CAGR	8%

Source: RBI: Annual Publications [Handbook of Statistics on Indian Economy](#)

Above table shows that the average annual growth rate (CAGR) of GDP for the Indian economy from 2015–16 to 2024–25 was 10%. Between 2015–16 and 2018–19, it rose at an average annual rate of 11%, and from 2019–20 it decreased by 6% but in 2020–21, it was -1% it was negatively due to covid-19. But in the years that followed, the economy began to improve. In the financial year **2021–22**, India's **GDP was increased by 19%**. On the contrary, after the severe contraction in 2020–21 due to the COVID-19 pandemic, India's economy **grew strongly** in 2021–22. Now, average annual rate of GDP in 2024-25 it is 10%.

Above table shows that the average annual growth rate (CAGR) of industry GVA for the Indian economy from 2015–16 to 2024–25 was 8%. Between 2015–16 and 2018–19, it rose at an average annual rate of 10%, and from 2019–20 it was -2% it is negative but in 2020–21, it was 2% only. After the severe contraction in 2020–21 due to the COVID-19 pandemic, India's economy **grew strongly** in 2021–22. Now, average annual rate of industry GVA in 2024-25 it is 6%.

Chart No-1: Trend of GDP & Industry GVA in India from 2015 to 2025



Industry GVA determinant of economic growth in 2015 to 2025:

For data analysis related to a period of 10 years, the long-term relationship between variables is examined with the help of regression models. Various determinants are analyzed with respect to a period of 10 years. It is very important to have a good understanding of industrial GVA related to GDP determinants. Therefore, here we present a descriptive trend analysis of the explanatory variables as well as the dependent variable, i.e. Gross Domestic Product (GDP). Along with this, the results of data analysis and interpretation of the results are given.

Regression Model Interpretation

Based on your regression output, the estimated regression equation is:

$$\text{GDP} = -5,203,953.373 + 6.81995 (\text{Industry GVA})$$

The Multiple R = 0.9947 shows a very strong positive correlation between Industry GVA and GDP. The $R^2 = 0.9894$ indicates that about 98.94% of the variation in GDP is explained by Industry GVA. This means the model has an excellent fit.

Significance of the Model

The F-statistic = 747.20 with Significance F = 3.45792E-09 (less than 0.05) shows that the overall regression model is statistically significant.

Coefficient Interpretation

The slope coefficient (6.81995) means that for every ₹1 crore increase in Industry GVA, GDP increases by approximately ₹6.82 crore. The p-value (3.45792E-09) is highly significant, confirming that Industry GVA has a strong impact on GDP.

Since the p-value is less than 0.05, we reject the null hypothesis and conclude that there is a significant positive relationship between Industry GVA and GDP. The results confirm that the secondary sector plays a crucial role in India's economic growth over the study period.

1.9 Limitations of the Study:

1. The study is limited to secondary data, which may contain reporting errors or revisions.
2. The analysis covers only a specific time period (last ten years from 2015-2025), which may not capture long-term structural changes.
3. The study mainly focuses on GDP and Industry GVA.

1.10 Chapter Summary:

This study examines the impact of industry GVA on India's economic growth from 2015-16 to 2024-25. Over a 10-year period, it is found that despite a temporary setback due to the COVID-19 pandemic, both GDP and industry GVA recorded overall positive growth after 2021-22. The estimation of the regression model confirms a strong and statistically significant positive relationship between secondary sector GVA and GDP. The R^2 value is 98.94%, indicating that secondary sector GVA explains a large part of the variance in GDP. The positive coefficient further indicates that secondary sector growth contributes significantly to overall economic expansion. Therefore, the study concludes that the manufacturing sector plays a significant role in India's economic growth. Promoting industrial innovation, strengthening manufacturing and ensuring sustainable industrial practices will be essential to achieve inclusive growth and sustain high economic growth in the future.

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AI-Driven Governance vs Democratic Accountability An Institutional Assessment of Algorithmic Decision-Making in India

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Introduction

Artificial Intelligence (AI) is increasingly embedded in public administration across the world. In India, the scale of digital governance is unprecedented. With over 1.3 billion Aadhaar enrollments and nearly 300 million beneficiaries receiving Direct Benefit Transfers (DBT), algorithmic systems are deeply integrated into welfare delivery and administrative decision-making. AI and data analytics are also used in taxation compliance systems, predictive policing pilots, and smart city surveillance networks.

The justification for AI adoption in governance lies in administrative efficiency, cost reduction, and improved targeting accuracy. However, democratic governance is not defined solely by efficiency. It depends on transparency, accountability, contestability, and citizen trust. When decision-making authority shifts partially from human bureaucrats to algorithmic systems, traditional accountability mechanisms may weaken.

This paper examines whether AI-driven governance in India enhances administrative capacity at the cost of democratic accountability. It analyzes institutional changes introduced by algorithmic systems and evaluates their implications for transparency, responsibility attribution, and procedural justice.

Research Problem

Democratic systems rely on identifiable chains of accountability. Citizens elect representatives, who oversee bureaucracies responsible for implementing policy decisions. In such systems, responsibility for administrative decisions can be traced to specific officials.

AI-driven governance modifies this chain. Algorithmic systems influence or determine outcomes such as welfare eligibility, tax risk classification, and surveillance prioritization. When decisions are generated by complex models, accountability may become diffused across programmers, data providers, software vendors, and administrative authorities.

Three institutional concerns arise:

1. Reduced transparency of decision logic
2. Diffusion of responsibility
3. Barriers to contesting automated decisions

The research problem centers on whether algorithmic governance creates an accountability deficit in democratic systems. If citizens cannot understand, challenge, or attribute responsibility for decisions affecting their rights, democratic legitimacy may be weakened despite improvements in efficiency.

Objectives of the Study

The study pursues the following objectives:

1. To examine the institutional transformation introduced by AI-driven governance in India.
2. To evaluate how algorithmic systems affect transparency and explainability.
3. To assess the implications of AI-based decision-making for democratic accountability.
4. To analyze the accessibility of grievance redress mechanisms in automated systems.
5. To propose policy safeguards that reconcile efficiency with democratic principles.

These objectives aim to move beyond technological evaluation and situate AI within democratic theory. The focus is not on technological performance but on institutional impact. By combining governance

theory with conceptual data, the study contributes to understanding how digital transformation reshapes state–citizen relationships in large democracies like India.

Review of Literature

Digital-era governance literature (Dunleavy et al., 2006) highlights how technology reshapes state capacity. AI extends this shift by embedding predictive analytics into administrative systems. The World Bank (2021) notes that GovTech enhances efficiency but requires institutional safeguards.

Bovens (2007) defines accountability as a relationship involving explanation and justification. Schedler (1999) emphasizes that accountability requires both answerability and enforceability. When algorithmic decisions are opaque, answerability becomes difficult.

Pasquale (2015) describes algorithmic systems as “black boxes,” arguing that lack of transparency undermines democratic oversight. In welfare contexts, Drèze et al. (2017) document cases where digital authentication errors affected beneficiary access.

Principal–agent theory (Moe, 1984) explains that information asymmetry weakens accountability structures. AI systems may increase asymmetry if citizens lack understanding of decision logic.

Despite growing global research on algorithmic governance, India-specific institutional analysis remains limited. This study addresses this gap by examining democratic implications within India’s digital governance framework.

Methodology

This study adopts a descriptive institutional analysis approach. It evaluates AI-driven governance using four accountability dimensions:

Dimension	Description
Transparency	Public visibility of decision logic
Explainability	Ability to justify outcomes
Contestability	Ease of appealing decisions
Responsibility Attribution	Clarity of accountable authority

Conceptual data is drawn from publicly available administrative statistics:

Indicator	Approximate Value
Aadhaar enrollments	>1.3 billion
DBT beneficiaries	~300 million
Annual digital transactions (UPI)	Billions
Smart city projects	100+ cities

These figures demonstrate the scale of AI and data integration in governance. The analysis evaluates institutional implications rather than technical performance metrics.

Evidence of AI Integration

AI systems are increasingly deployed across governance sectors:

Welfare Systems

Algorithmic filters identify eligible beneficiaries and detect anomalies. Over 300 million individuals receive DBT-linked transfers annually.

Taxation

AI-driven analytics identify high-risk tax profiles using transaction data and pattern recognition.

Predictive Policing

Some cities experiment with data-driven crime forecasting tools to allocate police resources.

Smart Cities

Over 100 smart cities integrate AI-enabled surveillance and traffic monitoring systems.

Table: Sectoral Use of AI in Governance

Sector	AI Application	Accountability Risk
Welfare	Eligibility scoring	Exclusion without explanation
Taxation	Risk analytics	Opaque classification
Policing	Crime prediction	Bias reinforcement
Urban	Surveillance systems	Privacy concerns

These applications demonstrate institutional penetration of AI systems.

Hypotheses

H1: Increased reliance on AI reduces procedural transparency.

H2: Algorithmic opacity weakens perceived accountability.

H3: Limited accessibility of appeal mechanisms reduces democratic contestability.

H4: Diffusion of responsibility increases in AI-mediated decisions.

These hypotheses are evaluated descriptively through institutional comparison rather than statistical estimation.

Testing of Hypotheses**1. H1: Transparency**

- Algorithmic decision logic is often not publicly disclosed. In welfare systems, beneficiaries may receive rejection without detailed reasoning. This supports H1.

3. H2: Accountability

- When decision rules are not explainable, citizens cannot evaluate fairness. Lack of explainability weakens answerability, supporting H2.

5. H3: Contestability

- Grievance systems exist but may require digital literacy and procedural navigation. Technical barriers reduce effective contestability.

7. H4: Responsibility Diffusion

- When algorithmic errors occur, responsibility may be attributed to data systems or technical vendors rather than identifiable officials. This supports H4.

Table: Accountability Comparison

Dimension	Bureaucratic Model	AI-Driven Model
Decision Authority	Identifiable officer	Hybrid (algorithm + officer)
Reason Disclosure	Written reasoning	Often limited
Appeal	Administrative review	Technical + administrative
Responsibility	Direct	Diffused

Key Observations

- AI enhances processing efficiency and scalability.
- Transparency mechanisms lag behind technological deployment.
- Institutional trust depends on procedural fairness, not only efficiency.
- Accountability becomes layered and complex in algorithmic systems.
- Democratic oversight mechanisms require adaptation.

The study finds that algorithmic governance introduces structural shifts rather than immediate democratic erosion. The long-term impact depends on institutional design.

Results and Discussion

The findings suggest that AI-driven governance creates a trade-off between administrative efficiency and accountability clarity. Efficiency improves through automation, but transparency and contestability may decline without safeguards.

Democratic systems rely on visible reasoning and enforceable accountability. When decisions are mediated by complex algorithms, citizens may perceive governance as opaque. This perception can weaken institutional trust even if policy outcomes improve.

However, AI does not inherently undermine democracy. Accountability deficits arise when technological systems outpace institutional safeguards. Embedding transparency standards, human oversight, and audit mechanisms can mitigate risks.

Therefore, the institutional challenge lies not in technological adoption but in governance design. AI must operate within frameworks that preserve constitutional principles of fairness and equality.

Recommendations

1. Introduce mandatory algorithmic transparency guidelines.
2. Ensure human-in-the-loop review for rights-based decisions.
3. Provide simplified explanations for adverse decisions.
4. Establish independent public AI audit bodies.
5. Strengthen legislative oversight of digital governance systems.

These safeguards aim to align AI deployment with democratic accountability standards.

Conclusion

AI-driven governance represents a significant transformation in India's administrative architecture. While it enhances efficiency and data-driven precision, it alters traditional accountability structures central to democratic legitimacy.

This study finds that algorithmic opacity, responsibility diffusion, and restricted contestability pose institutional risks. However, these risks are manageable through deliberate policy design.

The future of governance depends on embedding AI within accountable frameworks rather than allowing efficiency to overshadow democratic principles. India's digital transformation must integrate technological advancement with constitutional safeguards to ensure inclusive and transparent governance.

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Organic Farming: Benefits and Challenges**Mrs. Megha Prashant Shirke.**Asst. Prof. Department of Economics
Kisan Veer Mahavidyalaya, Wai**Abstract:**

There is a developing significance on health benefits as people are getting cognizant about the food. People are becoming more aware of the health benefits of the food they eat for themselves and their family members. Because of this, the demand for organic farming and organic products is increasing. In earlier times, people consumed fresh local vegetables, pulses, and organic foods, which helped them live longer and healthier lives. This paper explains the benefits and challenges of organic farming and discusses its present situation in India.

Organic farming has emerged as a sustainable alternative to conventional agriculture in response to increasing concerns about soil degradation, environmental pollution, food safety, and climate change. This study examines the growth, status, types, benefits, challenges, and policy support of organic farming in India. As of 2023–24, India has approximately 7.30 million hectares under organic certification, including cultivated land and wild harvest areas, and produces nearly 3.6 million metric tons of certified organic products. The country is also a significant exporter of organic commodities, with exports valued at about ₹4007.91 crore during the same period.

The paper highlights various forms of organic farming practiced in India, such as pure organic farming, integrated organic farming, natural farming, biodynamic farming, permaculture, and urban organic farming. It also discusses major government initiatives including the National Programme for Organic Production (NPOP), Participatory Guarantee System (PGS-India), Paramparagat Krishi Vikas Yojana (PKVY), Mission Organic Value Chain Development for North Eastern Region (MOVCDNER), and the National Mission on Natural Farming (NMNF).

Despite its advantages—such as improved soil health, environmental protection, enhanced biodiversity, better nutritional quality, and support for sustainable agriculture—organic farming faces several challenges. These include shortage of biomass, supply–demand disparities, labor-intensive practices, high market prices, and inadequate infrastructure.

The study concludes that organic farming plays a vital role in promoting sustainable agricultural development, strengthening rural livelihoods, and ensuring long-term food security in India. With adequate policy support, infrastructure development, farmer awareness, and market linkages, organic farming can significantly contribute to environmentally sustainable and economically viable agriculture.

Keywords: - Organic farming, Organic products, Soil health, Biodiversity, Eco Friendly farming, Green manure

Objective:

- 1.To study the importance of organic farming in the present era.
- 2.To examine the benefits of organic farming.
- 3.To examine the challenges associated with organic farming.

Introduction: -

Agricultural development policies in developing countries now emphasize increasing land productivity at lower costs while ensuring high efficiency and minimum harm to human health and the environment. In recent years, organic farming has gained significant importance as a sustainable alternative to conventional agriculture. Growing concerns about soil degradation, excessive use of chemical fertilizers and pesticides, climate change, and food safety have increased global and national interest in organic farming systems.

Over the past decade, organic farming has been recognized for its potential to protect the environment, conserve non-renewable natural resources, improve soil fertility, and enhance food quality. It supports biodiversity, reduces pollution, and promotes ecological balance. Organic farming is not only important from the consumer's perspective due to rising demand for safe and chemical-free food, but it is also beneficial for farmers by reducing input costs and improving long-term soil health. According to the National Programmed for Organic Production (NPOP) under APEDA (Government of India): As of 2023–24, the total area under organic certification in India was approximately 7.30 million hectares. In India, organic farming is increasingly viewed as a key approach for achieving sustainable agricultural development and strengthening rural livelihoods. The country has one of the largest numbers of organic producers in the world, and the area under organic cultivation is gradually expanding with government support through various schemes and certification programmers. Organic farming is especially suitable for small and marginal farmers, as it relies on locally available resources and traditional knowledge. Thus, organic farming plays a vital role in promoting sustainable agriculture, environmental protection, and long-term food security in India.

Review of Literature

1. **Mendon (2020)**, organic farming is a distinctive agricultural practice that balances environmental sustainability while reducing the harmful effects of chemical inputs on consumer health. The authors emphasize that organic production creates a positive perception among consumers by ensuring food safety and promoting eco-friendly farming methods.
2. **Varkey (2020)** argues that both developing and developed countries are increasingly emphasizing environmentally sustainable agricultural production methods and practices. He also notes that traditional indigenous farming knowledge is being critically examined due to changing environmental, economic, and technological factors.
3. **Magnate (2018)** examines the relationship between small holder organic farming and entrepreneurship, highlighting how organic farming contributes to environmental conservation while entrepreneurship enhances economic development. Using qualitative case-study analysis, the study identifies the planning strategies and competencies required by smallholder farmers to successfully establish and manage organic farm enterprises.
4. **Giovannucci (2007)** asserts that there is substantial evidence suggesting that organic farming methods are particularly suitable for small and resource-poor farmers. His findings indicate several direct benefits and positive externalities associated with organic agriculture, supporting the view that promoting organic farming among smallholders is both justified and beneficial.
5. **Yadav (2013)** post-independence period, one of India's major challenges has been to produce sufficient food for its rapidly growing population. To address this challenge, high-yielding crop varieties have been adopted along with increased use of irrigation, fertilizers, and modern agricultural inputs. However, the authors suggest that these practices have also raised concerns regarding sustainability, thereby strengthening the relevance of organic farming as a viable alternative for long-term agricultural development.

Explanation: Organic Farming in India

Organic farming in India has emerged as a sustainable alternative to conventional agriculture due to increasing concerns over environmental degradation, soil fertility loss, health hazards from chemical residues, and climate change. With a rapidly growing population and limited natural resources such as land, water, and fossil fuels, India is shifting towards eco-friendly and resource-efficient agricultural practices. Organic farming promotes harmony between nature, soil, plants, animals, and human beings. Organic farming is an agricultural system that relies on natural inputs and ecological processes instead of synthetic fertilizers, pesticides, genetically modified organisms (GMOs), and artificial growth regulators. The need of the hour is a natural balance between life and property for existence. Keeping in view the fact that fossil fuels are on their way of extinction and are non-renewable, organic, nature friendly ways of farming and agriculture has gained importance

Area under Organic Farming in India

Total certified organic cultivation area in India (FY 2023-24): about 7.3 million ha (includes farm and wild harvest zones). Wild harvest collection: ~2.8 million In addition, significant area is under conversion to organic status (land transitioning from conventional to organic systems). apeda.gov.in India produced roughly 3.6 million metric tonnes of certified organic products in 2023-24 across food crops, fiber, spices, tea & coffee, medicinal plants, and vegetables. Organic product exports in FY 2023-24 were ~2.61 lakh MT, valued at around ₹4007.91 crore (~USD 495 million).

➤ Organic Farming in India (2023-24):

State	Organic Certified Area(ha)	Total Organic Producton(MT)
Madhya Pradesh	11,48,236.07	9,00,086.49
Maharashtra	10,01,080.32	11,61,230.65
Rajasthan	5,80,092.22	4,00,926.98
Gujarat	6,80,819.99	2,40,190.66
Odisha	1,81,022.28	1,59,521.40
Uttarakhand	1,01,820.39	44,745.43
Uttar Pradesh	66,391.34	1,59,149.85
Sikkim	75,729.78	Not separately reported
Kerala	44,263.91	41,128.53
Karnataka	~82,015.56	1,97,328.09

(latest available data from the National Programme for Organic Production (NPOP) under APEDA:)

Types of Organic Farming

1. **Pure organic farming:** is a system in which no chemical fertilizers, pesticides, or growth regulators are used at any stage of cultivation. Farmers depend entirely on organic manures such as compost, green manure, vermicomposting, and bio-fertilizers, along with natural pest control methods.
2. **Integrated organic farming:** combines crop production with activities like livestock rearing, poultry, fisheries, and composting so that farm waste is recycled and resources are used efficiently. This system increases overall farm productivity and provides multiple sources of income.
3. **crop-based organic farming:** which mainly focuses on the organic cultivation of crops using crop rotation, mixed cropping, and biological pest control. In contrast, livestock-based organic: farming emphasizes organic animal husbandry, where animals are fed organic feed, synthetic hormones and antibiotics are avoided, and animal waste is used as manure to enrich soil fertility.
4. **Natural organic farming:** also known as traditional or indigenous organic farming, relies on locally prepared natural inputs such as cow dung, cow urine, Jeevamrut, Beejamrut, and Panchagavya, with minimal dependence on external resources.
5. **Biodynamic farming:** is a specialized form of organic farming based on ecological and spiritual principles, where natural preparations are used and farming activities are aligned with lunar and cosmic cycles to improve soil and crop vitality. Permaculture is another type that aims at creating a self-sustaining agricultural ecosystem by imitating natural systems and ensuring efficient use of land, water, and energy.
6. **organic urban and terrace farming:** is practiced on a small scale in cities and towns, using organic methods in kitchen gardens and terraces to produce fresh, chemical-free vegetables. Together, these types of organic farming contribute to sustainable agriculture, environmental protection, and healthy food production.

(6.3) National Programme for Organic Production (NPOP): which regulates standards for organic farming and certification in India. It ensures that organic products meet quality standards, especially for export purposes, and is implemented through APEDA. For domestic markets, the

government introduced the Participatory Guarantee System (PGS-India), a low-cost certification system that allows farmer groups to certify organic products locally.

1. **Paramparagat Krishi Vikas Yojana (PKVY):** launched to promote organic farming through a cluster-based approach. Under this scheme, farmers receive financial assistance for organic inputs, training, certification, and marketing support. The government also started the Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) to develop organic farming in the North-East by supporting production, processing, and marketing of organic products.
2. **National Mission on Natural Farming (NMNF):** encourages farmers to reduce dependence on chemical fertilizers and adopt natural farming techniques using bio-inputs. The government also promotes organic farming under the Rashtriya Krishi Vikas Yojana (RKVY) and provides support through Farmer Producer Organizations (FPOs) to improve market access.

Challenges of Organic Farming:

1. Shortage of Biomass:

Organic farming relies on natural inputs such as compost, farmyard manure, and green manure. However, the availability of sufficient organic matter to meet crop nutrient requirements remains a major concern. Many experts argue that the existing supply of biomass may not be adequate to sustain large-scale organic cultivation.

2. Disparity Between Supply and Demand:

There is a mismatch between production areas and demand centers. While grains can be transported easily, perishable organic fruits and vegetables must be produced near consumption areas. Demand is concentrated in metropolitan cities where agricultural land is limited, creating supply chain challenges.

3. Labor Intensive Nature:

Organic farming requires greater interaction between farmers and crops for weed control, pest management, and soil monitoring. It is more labor-intensive compared to chemical farming, which increases production costs and reduces productivity per farmer.

4. High Market Price:

Due to careful cultivation, certification costs, and lower initial yields, organic products are priced higher than conventional products. This limits accessibility for many consumers and restricts market expansion.

5. Lack of Specialized Infrastructure:

There is inadequate infrastructure for storage, processing, transportation, and marketing of organic products. Many organic farms still rely on conventional supply chains, which may reduce efficiency and environmental benefits.

Benefits of Organic Farming:

1. **Better Taste and Nutrition:** Organically grown fruits and vegetables often have better taste and improved nutritional value because they are grown naturally without synthetic growth stimulants. The natural development process enhances sugar content and nutrient composition.
2. **Environmental Protection:** Organic farming reduces soil, air, and water pollution. It enhances soil fertility, promotes biodiversity, and supports ecological balance by avoiding chemical inputs. Organic farming plays a significant role in environmental protection by promoting sustainable agricultural practices that maintain ecological balance. Unlike conventional farming, which relies heavily on synthetic fertilizers, pesticides, and chemical growth regulators, organic farming uses natural inputs such as compost, green manure, bio-fertilizers, and biological pest control methods. This reduces environmental pollution and protects natural resources.
3. **Improved Soil Health:** Practices such as crop rotation, composting, and green manuring increase soil organic matter and improve long-term productivity. Organic farming has a strong and positive impact on soil health. Soil is a living system that contains microorganisms, organic matter, minerals,

air, and water. Maintaining soil health is essential for sustainable agricultural production. Unlike conventional farming, which depends heavily on chemical fertilizers and pesticides, organic farming focuses on improving soil fertility through natural and biological processes. Organic farming also promotes microbial activity in the soil. Beneficial microorganisms such as bacteria, fungi, and earthworms play a vital role in nutrient cycling and decomposition of organic materials. Chemical fertilizers and pesticides often harm these organisms, whereas organic practices support their growth. Healthy microbial populations improve soil aeration and nutrient absorption by plants.

4. **Sustainable agriculture:** Organic farming reduces dependence on non-renewable resources and supports climate-resilient agriculture. Organic farming and sustainable agriculture are closely related approaches that aim to ensure long-term agricultural productivity while protecting the environment, human health, and natural resources. Organic farming is a method of agriculture that avoids the use of synthetic fertilizers, pesticides, genetically modified organisms (GMOs), and artificial growth regulators. Instead, it relies on natural inputs such as compost, farmyard manure, green manure, crop rotation, biological pest control, and organic waste recycling.

Conclusion:

Organic farming represents a sustainable and environmentally responsible approach to agricultural production. Although it faces several challenges such as shortage of biomass, supply-demand mismatch, labor-intensive practices, high market prices, and lack of specialized infrastructure, it continues to gain importance due to its long-term ecological and health benefits. These challenges highlight the need for improved policy support, better supply chain management, farmer training, and infrastructure development. Despite initial constraints, organic farming offers significant advantages. It enhances soil health through natural nutrient management, increases microbial activity, and improves long-term soil fertility. It reduces environmental pollution by eliminating synthetic chemicals, thereby protecting soil, water, air, and biodiversity. Additionally, organically grown food is often associated with better taste and improved nutritional quality. Organic farming also contributes to sustainable agriculture by reducing dependence on non-renewable resources and promoting climate-resilient farming systems. It supports ecological balance while ensuring the well-being of farmers, consumers, and future generations. In conclusion, while organic farming may not be free from limitations, it plays a crucial role in achieving sustainable agricultural development. With proper infrastructure, awareness, research support, and government initiatives, organic farming can become a strong foundation for environmentally sustainable and economically viable agriculture.

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Climate Change and Its Economic Impact on India**Miss.Ayesha Shaikh,**
Student of M.A. Economics**Introduction:**

Climate change refers to long-term alterations in temperature, precipitation patterns, and other atmospheric conditions largely caused by human activities such as burning fossil fuels, deforestation, and industrialization. According to the Intergovernmental Panel on Climate Change (IPCC), global temperatures have increased by approximately 1.1°C since pre-industrial times, leading to severe environmental and economic consequences. India is particularly vulnerable to climate change due to its geographical diversity, long coastline, dependence on monsoon rainfall, and heavy reliance on agriculture. Nearly 45% of India's workforce depends directly or indirectly on agriculture, making climatic instability a serious economic concern. Rising temperatures, irregular monsoons, floods, droughts, and cyclones are increasingly affecting production, employment, public health, and overall economic growth. Climate change is therefore not only an environmental issue but also a major economic challenge that threatens India's sustainable development.

Objectives of the Study:

1. To understand the concept and causes of climate change
2. To examine the economic impact of climate change in India
3. To analyze its effects on agriculture, employment, industry, and health
4. To suggest policy measures to reduce economic losses and promote sustainable growth.

Research Methodology:

The present study is descriptive and analytical in nature. It is based on secondary data collected from government reports, Economic Surveys of India, IPCC reports, research journals, and environmental economics textbooks. The analysis involves: Review of existing literature Comparative analysis of economic sectors Examination of trends in climate-related disasters.

1. Nature of the Study: This study is mainly qualitative, supported by quantitative information collected from government and international reports. It describes the relationship between climate change and economic performance in India and analyses its impact on major sectors like agriculture, employment, industry, and health.
2. Period of study: The study mainly focuses on recent years, particularly after 2000, when the impact of climate change has become more visible in India through frequent natural disasters and temperature rise
3. Tools and Techniques Used: The study uses:
 - Comparative analysis of different economic sectors
 - Trend analysis of climate-related disasters
 - Review of literature and policy documents
 - Conceptual analysis of economic theories such as externalities and sustainable development

Limitations of the Study The study:

relies entirely on secondary data. Lack of primary survey limits ground-level analysis. Economic impacts are sometimes difficult to measure precisely due to indirect effects.

Sources of Data:

1. Government of India Economic Surveys
2. IPCC Assessment Reports
3. Ministry of Environment, Forest and Climate Change reports

4. Research journals on environmental economics
5. World Bank climate data

Explanation:

(6.1) Climate Change and Its Economic Impact on India

Climate change has serious economic consequences for India, affecting key sectors like agriculture, employment, industry, health, and overall economic growth.

1. **Agriculture:** Agriculture is the most vulnerable sector in India. Irregular rainfall patterns, delayed monsoons, and extreme weather conditions reduce crop yields and lower farmer incomes. Rising temperatures also affect soil quality and water availability. Since nearly half of India's workforce depends on agriculture, reduced productivity leads to rural poverty, food inflation, and threats to food security. Climate uncertainty also increases farmers' dependence on credit, raising the risk of indebtedness.
2. **Employment:** Climate change affects employment by reducing agricultural work opportunities and lowering labour productivity due to extreme heat. Crop failure and income loss force rural workers to migrate to urban areas in search of jobs, leading to pressure on urban infrastructure and growth of informal employment. Heat stress in sectors like construction and outdoor labour reduces working hours and overall economic output.
3. **Industry:** Industries depend on stable supply of raw materials, electricity, and water. Climate-related disasters such as floods and cyclones damage factories, transport systems, and power infrastructure. This increases production costs and disrupts supply chains. Coastal industries are particularly at risk due to rising sea levels. Frequent disruptions reduce investment confidence and slow industrial growth.
4. **Health:** Extreme heat, pollution, and spread of vector-borne diseases increase health risks. Heatwaves cause heat strokes and dehydration, while changing climatic conditions increase diseases like malaria and dengue. As a result, government health spending rises, and households spend more on medical treatment. Poor families are more affected, increasing inequality.
5. **Economic Growth:** Frequent natural disasters cause heavy financial losses by damaging crops, infrastructure, and property. Government expenditure on relief and rehabilitation increases, reducing funds available for development projects. In the long term, climate change may slow GDP growth and affect overall economic stability. Therefore, climate change is not only an environmental issue but also a serious economic challenge that affects India's sustainable development and long-term growth prospects. Frequent climate disasters slow down GDP growth and increase government spending on relief and rehabilitation. Thus, climate change poses a major economic challenge for India's sustainable development.

6.2 Analysis and Discussion:

Climate change increases poverty and inequality in India. Rural populations, small farmers, and informal workers face the highest risks. Regional inequality is also widening, as coastal and drought-prone states experience greater economic losses. From an economic perspective, climate change represents a case of market failure due to negative externalities. Industrial activities generate greenhouse gases without accounting for social costs. Therefore, government intervention is necessary.

6.3 Policy Measures for Economic Stability:

1. **Promotion of Climate-Resilient Agriculture:** Drought-resistant seeds, Improved irrigation systems.
2. **Investment in Renewable Energy:** Solar and wind energy expansion, Reduction in fossil fuel dependence.
3. **Carbon Pricing and Environmental Taxes:** To internalize environmental costs.
4. **Green Infrastructure Development:** Climate-resilient roads, housing, and urban planning.

5. Disaster Management Systems: Early warning systems, Insurance schemes for farmers Sustainable development policies are essential to balance economic growth with environmental protection.

6.4 Findings:

1. Climate change significantly reduces agricultural productivity
2. Rural employment instability is increasing
3. Economic losses from natural disasters are rising
4. Public health expenditure is growing
5. Long-term economic growth is at risk
6. Poor and vulnerable populations are most affected

Conclusion:

Climate change is both an environmental and economic challenge for India. Its impact is visible across agriculture, employment, industry, health, and overall economic growth. Without effective policy intervention, climate change may slow India's development progress and increase poverty and inequality. Therefore, India must adopt climate-resilient development strategies, promote renewable energy, strengthen environmental regulations, and invest in sustainable infrastructure.

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A Temporal Analysis of Rainfall Variability And Crop Production Patterns in Ahilyanagar District

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Abstract:

This study examines the temporal relationship between rainfall variability and crop production patterns in Ahilyanagar District, Maharashtra, during the period 2006–2024. Agriculture in the district is predominantly rain-fed and highly sensitive to monsoon fluctuations, making it vulnerable to climatic variability. The study utilizes secondary data on annual rainfall obtained from the India Meteorological Department and crop production statistics collected from the Directorate of Economics and Statistics. Statistical techniques including trend analysis, Pearson's correlation, and simple linear regression were employed to evaluate the strength and nature of rainfall–crop relationships.

The results reveal considerable inter-annual variability in rainfall, with noticeable drought years and irregular monsoon distribution affecting agricultural output. Correlation analysis indicates strong positive relationships between rainfall and production of Moong ($r = 0.743$), Wheat ($r = 0.695$), Groundnut ($r = 0.672$), Harbhara ($r = 0.652$), and Tur ($r = 0.608$), suggesting high rainfall sensitivity of pulses and oilseeds. Regression results further demonstrate substantial explanatory power of rainfall for certain crops, particularly Harbhara ($R^2 = 0.920$), Wheat ($R^2 = 0.891$), and Bajra ($R^2 = 0.863$). In contrast, Cotton ($R^2 = 0.531$) exhibits comparatively weaker dependence on rainfall, indicating the influence of irrigation, technological inputs, and market-driven factors.

The findings confirm that rainfall variability significantly influences crop production trends in Ahilyanagar District, particularly for rain-fed crops. The study highlights the need for climate-resilient agricultural planning, improved water management strategies, and diversification toward drought-tolerant crops to mitigate production instability under increasing climatic uncertainty.

Keywords: rainfall variability, crop production, correlation. regression

I.Introduction

Agriculture is one of the most climate-sensitive sectors of the Indian economy, particularly in regions where farming depends heavily on monsoon rainfall. Climate variability, expressed through fluctuations in rainfall, temperature, and the occurrence of extreme weather events, has become a major challenge to agricultural sustainability in recent decades. During the period 2006–2024, noticeable changes in climatic conditions have been observed across many parts of India, directly influencing crop productivity and farmers' livelihoods. The Ahilyanagar District, located in a semi-arid agro-climatic region, provides a suitable case for examining the relationship between climate variability and crop yield trends.

Climate variability refers to short- to medium-term deviations from average climatic conditions, such as irregular rainfall, temperature extremes, and unexpected weather events. Unlike long-term climate change, climate variability creates uncertainty at seasonal and annual levels, making agricultural planning difficult. In India, where a large proportion of cultivated land is rain-fed, agriculture remains highly vulnerable to such variability (Planning Commission, 2014). Ahilyanagar District has experienced frequent droughts, rising temperatures, and irregular monsoon behaviour over the past two decades, intensifying stress on agricultural systems.

The agricultural economy of Ahilyanagar District is largely based on the cultivation of cereals, pulses, and oilseeds. Crops such as jowar, bajra, wheat, maize, Tur, Cotton, Moog, gram, and groundnut play a vital role in local food security and income generation. These crops are highly sensitive to changes in rainfall

Rainfall variability has emerged as a key factor influencing crop yields in the district. Although total annual rainfall does not show a consistent declining trend, its uneven distribution has significantly affected soil moisture availability. Long dry spells during critical crop growth stages often result in moisture stress, while heavy rainfall events lead to runoff and soil erosion. Studies indicate that even minor changes in rainfall timing can lead to substantial yield losses in rain-fed agricultural regions (Gadgil & Gadgil, 2006).

Climate variability has also influenced cropping patterns and farming strategies in the district. Farmers have increasingly shifted toward short-duration and drought-tolerant crops as adaptive measures. Crop diversification, changes in sowing dates, and water conservation practices have become common responses to climatic uncertainty. Nevertheless, small and marginal farmers remain highly vulnerable due to limited access to resources and climate-resilient technologies (Birthal et al., 2014).

II. Study area

Ahilyanagar District extends between 18°02' to 19°09' North latitude and 73°09' to 75°05' East longitude. It is bounded by Nashik district to the north, Pune district to the west, Solapur district to the south, and Beed and Chhatrapati Sambhajinagar districts to the east. The district is



Aayushi International Interdisciplinary Research Journal (ISSN 2349-638x)
Impact Factor 8.379 Peer Reviewed Journal www.aiirjournal.com

district to the north, Pune district to the west, Solapur district to the south, and Beed and Chhatrapati Sambhajanagar districts to the east. The district is characterized by undulating terrain, basaltic rock formations, and predominantly black cotton soils.

The climate of the district is semi-arid, with hot summers, moderate winters, and a short monsoon season. Annual rainfall ranges between 500 and 650 mm and is unevenly distributed. Agriculture is largely rain-fed, and major crops include jowar, bajra, wheat, gram, and groundnut. Frequent droughts and temperature extremes make agriculture highly vulnerable, making Ahilyanagar District an ideal study area for climate-agriculture research.

III.Objectives of the Study

- To analyze the impact of rainfall variability on crop production trends in Ahilyanagar District during the period 2006–2024.
- To assess the relationship between rainfall variability and crop production using statistical techniques.

IV.Hypotheses

H₀: rainfall variability has no significant impact on crop production trends in Ahilyanagar District.

H₁: rainfall variability has a significant impact on crop production trends in Ahilyanagar District.

V.Data and Methodology

The present study is based primarily on **secondary data** collected from reliable and officially recognized sources. The database was developed to examine long-term rainfall variability and its impact on crop production trends in Ahilyanagar District during the period **2006–2024**. The data were compiled, verified, and processed to ensure consistency and suitability for statistical and temporal analysis.

5.1 Climatic Data

Climatic data include annual rainfall records for Ahilyanagar District. Rainfall data (in millimeters) were obtained from the **India Meteorological Department (IMD)** and district-level meteorological stations. These data were used to analyze rainfall variability, drought occurrences, and extreme climatic events. Missing values were cross-checked against district statistical records and long-term averages to maintain dataset continuity.

5.2 Agricultural Data

Crop-related data consist of area, production, and yield statistics for major crops such as **wheat, jowar, bajra, maize, gram, and groundnut**. These data were collected from the **Directorate of Economics and Statistics (DES), Government of Maharashtra**, and the **District Statistical Abstract (DSA), Ahilyanagar**. Crop yield data are expressed in metric tons, depending on the reporting format. The dataset enables time-series analysis of crop yield trends and inter-crop comparisons.

5.3 Spatial Data

Spatial datasets were prepared using **Survey of India topographical sheets**, district boundary maps. These data were used to generate GIS-based maps showing district location, taluka boundaries, rainfall distribution, and crop production patterns.

5.4 Data Processing and Analysis

All collected data were digitized, tabulated, and analyzed using **MS Excel**, and **QGIS** software. Statistical techniques such as trend analysis, coefficient of determination, correlation (Pearson), and regression analysis were applied to examine climate–crop relationships.

VI.Result and Discussion

The following table shows the rainfall (mm) during 2006 to 2024, along with the production of certain crops in metric tonnes.

Table 1 – Rainfall And Crop Production 2006-2024

Years	Rainfall (mm)	Crop Production (00'' metric tonnes)								
		Wheat	Jowar	Bajra	Maize	Cotton	Tur	Harbhar	Moon	Groundnut
2006	736.9	2481	515	1489	642	365	66	656	99	139
2007	556.5	2711	2841	1741	1025	821	79	603	144	125
2008	577.4	2192	3279	924	1002	1586		657		117
2009	510.3	1781.06	4095.21	1501.83	780.09	700.96	64.1	732.04	101.23	27.1
2010	771.3	2241	2921	1868	1833	2211	113	811	124	94
2011	488.4	887	1232	1795	1481	2381	64	277	69.8	138
2012	383.21	461	670	554	1169	881	22	217	6	12
2013	591.13	862.01	3070.26	2250.27	1154.14	1313.73	51.13	255.59	6.9	31.5
2014	382.11	850	2798	1077	580	967	18	852	32	51
2015	473.2	312.42	2608.93	327.96	159.75	536.29	22	543	11	28
2016	642.4	1937.28	1175.57	1934.84	1220.14	267.18	352.01	850.92	239.66	56.47
2017	794.4	1710.32	1583.47	1473.48	1031.32	316.37	208.13	771.97	168.2	61.11
2018	366.2	674.88	784.41	663.74	1521.72	260.33	62.3	288.58	110.09	39.38
2019	670	2338.95	391.01	1308.5	1320.34	246.43	162.76	881.19	59.24	38.57
2020	907.65	2592.78	1903.84	1308.5	679.1	489.34	450.9	1021.14	461.12	217.33
2021	832.6	2406.53	1500.87	1101.29	3774	210.83	473	1074.83	295.77	121.64
2022	791.9	3261.44	1394.83	1220.75	4420.72	513.07	508.85	1145.6	406.89	218.52
2023	474.4	2577.19	1800.04	362.32	2116.2	259.58	374.99	967.28	65.73	19.58
2024	757.5	3852.44	2893.72	1068.98	3083.85	644.48	853.86	1194.25	404.7	197.78

6.1 Correlation Analysis

The table shows the multiple correlation matrix of rainfall and crop production.

Table 2 – correlation matrix

Variables Crops	Rainfall (mm)	Wheat	Jowar	Bajra	Maize	Cotton	Tur	Harbhar	Moon	Groundnut
Rainfall (mm)	1									
Wheat	0.695	1								
Jowar	-0.067	0.070	1							
Bajra	0.376	0.144	0.162	1						

Maize	0.408	0.563	- 0.152	- 0.057	1					
Cotton	-0.153	- 0.225	0.367	0.385	- 0.119	1				
Tur	0.608	0.774	- 0.001	- 0.099	0.696	- 0.315	1			
Harbhara	0.652	0.802	0.100	- 0.068	0.529	- 0.391	0.78 1	1		
Moong	0.743	0.728	- 0.009	0.085	0.572	- 0.262	0.85 0	0.716	1	
Groundnut	0.672	0.681	- 0.009	0.200	0.470	0.096	0.62 7	0.504	0.828	1

Rainfall has a strong positive correlation with Moong (0.743), Wheat (0.695), Groundnut (0.672), Harbhara (0.652), Tur (0.608), Maize (0.408), and Bajra (0.376). These values suggest that higher rainfall years are generally associated with higher production of these crops. The relationship is particularly strong for pulses like Moong and Tur, indicating that these crops are highly rainfall-sensitive in the study area. This implies that inter-annual variability in rainfall likely drives production volatility for pulses and oilseeds.

However, Jowar shows almost no relationship with rainfall (-0.067), and Cotton shows a weak negative correlation (-0.153). That's important. It suggests that these crops are either less dependent on direct rainfall (possibly due to irrigation) or are adapted to relatively drier conditions. In the case of Cotton, the negative association may reflect excess rainfall affecting yield or area decisions, especially if waterlogging occurs.

Now look at inter-crop correlations. Wheat, Tur, Harbhara, and Moong are highly positively correlated with each other (many values above 0.70). For example, Tur–Moong (0.850), Tur–Harbhara (0.781), and Wheat–Harbhara (0.802). That indicates these crops may be responding to similar agro-climatic conditions or are part of similar cropping systems. But here's the warning: such high correlations may also indicate multicollinearity, meaning production levels are moving together due to common external drivers like rainfall, irrigation expansion, or policy support.

6.2 Regression Analysis

The table has a statistical regression analysis of rainfall and crop production with coefficient of determination values.

Table 3- Regression Analysis

Variable Crops	Value of R ²	R ² in %
Wheat	0.891	89
Jower	0.716	72
Bajra	0.863	86
Maize	0.716	72
Cotton	0.531	53
Tur	0.629	63
Harbhara	0.920	92
Moong	0.719	72
Groundnut	0.781	78

The regression results indicate substantial variation in the explanatory power of rainfall across different crops. The highest coefficient of determination (R²) is observed for Harbhara (0.920), implying that 92% of the variation in Harbhara production is explained by rainfall. Similarly, Wheat (0.891) and Bajra (0.863) show very high R² values, indicating strong dependence on rainfall conditions. These crops appear highly climate-sensitive, and rainfall variability is a dominant determinant of their production fluctuations.

Groundnut (0.781), Moong (0.719), Jowar (0.716), and Maize (0.716) exhibit moderately strong explanatory power, suggesting that rainfall accounts for approximately 70–78% of production variability. While rainfall is a major influencing factor, other variables such as irrigation availability, input use, soil conditions, and technological improvements may also play meaningful roles.

In contrast, Cotton shows the lowest R^2 value (0.531), indicating that only 53% of production variability is explained by rainfall. This suggests that Cotton production is relatively less dependent on rainfall and may be influenced more significantly by irrigation, hybrid seed adoption, pest management practices, or market-driven area allocation decisions.

Tur (0.629) also shows moderate explanatory power, indicating partial but not exclusive dependence on rainfall

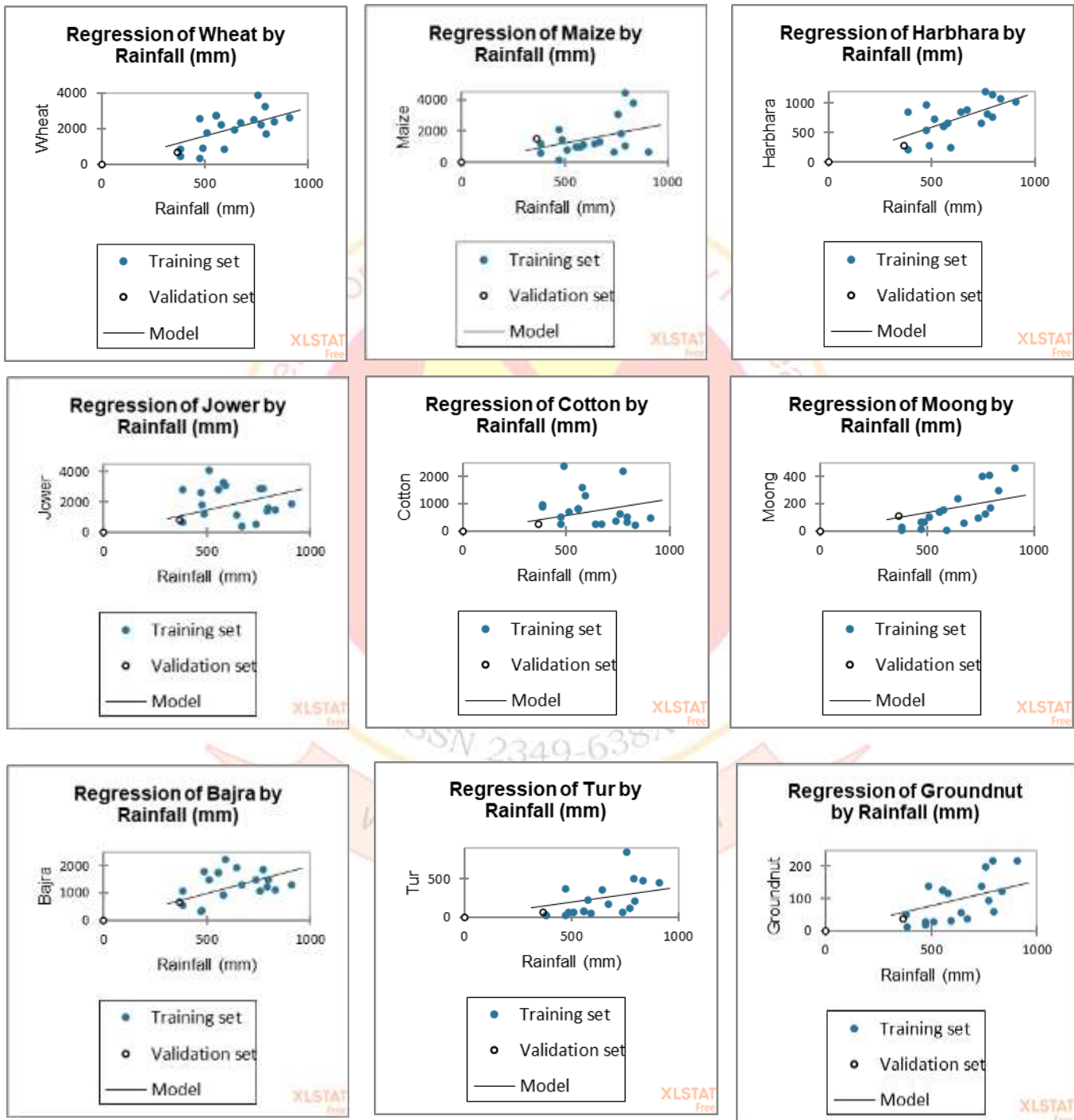


Fig2- Regression Trends of Rainfall and Crop Production.

VII. Conclusion

The temporal analysis of rainfall and crop production patterns in Ahilyanagar District from 2006 to 2024 clearly demonstrates that rainfall variability is a critical determinant of agricultural performance in the region. The district's semi-arid climate, coupled with heavy dependence on monsoon rainfall, makes crop production highly vulnerable to inter-annual climatic fluctuations.

The study confirms a statistically meaningful association between rainfall and the production of major crops. Pulses and oilseeds such as Harbhara, Moong, Tur, and Groundnut show strong rainfall sensitivity, as reflected in both correlation and regression analyses. Harbhara, in particular, exhibits the highest explanatory dependence on rainfall ($R^2 = 0.920$), indicating that rainfall fluctuations account for a substantial portion of production variability. Wheat and Bajra also demonstrate high climatic dependence. Conversely, Cotton shows comparatively lower rainfall dependence, suggesting that irrigation infrastructure, technological inputs, and economic factors play a larger role in determining its production levels.

The findings reject the null hypothesis and support the alternative hypothesis that rainfall variability significantly impacts crop production trends in Ahilyanagar District. However, rainfall alone does not fully explain production variability across all crops, indicating the presence of additional structural and management-related factors.

Given increasing climatic instability, the study underscores the importance of strengthening drought mitigation strategies, expanding micro-irrigation systems, promoting crop diversification, and encouraging climate-resilient agricultural practices. Long-term agricultural sustainability in Ahilyanagar will depend on reducing rainfall dependence through adaptive planning, technological innovation, and integrated water resource management.

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Circular Economy And Artificial Intelligence**Mr.Pathan Rajukhan Magbul**

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Abstract:

Artificial intelligence (AI) is being used in many fields today to try to increase work efficiency. By boosting the circular economy's efficiency, artificial intelligence (AI) can even boost the economy. The literature on the circular economy mainly talks about how to use resources more efficiently, cut down on waste, and make production systems that are good for the environment. It also talks about the change from linear to closed-loop models. The circular economy is an economic system designed to eliminate waste, keep resources in use for as long as possible, and regenerate natural systems. We can apply AI in many stages for example, smart design and eco-design, predictive maintenance and product life extension, reverse logistics and take-back systems, etc. Efforts should be made to promote the circular economy.

Keywords: Circular economy, artificial intelligence,

1.1 Introduction:

The Japanese concept of Mottainai expresses that it is a shame for something to go to waste without having made use of its potential in full — something that happens with regularity in a linear economy.

Today, efforts are being made to increase work efficiency by using artificial intelligence (AI) in many fields. Even in the circular economy, using AI can strengthen the economy by increasing the efficiency of the circular economy. The circular economy has emerged as a sustainable alternative to the linear model of production and consumption by emphasizing waste minimization and efficient use of resources, while artificial intelligence (AI) is simultaneously transforming decision-making across industries through data-driven insights and automation. The integration of AI into circular economy practices creates new opportunities to enhance material reuse, reduce waste, and optimize systems across the entire value chain. AI technologies such as machine learning, computer vision, and predictive analytics enable real-time monitoring of resource flows and lifecycle impacts, supporting smarter product design, efficient waste segregation, and improved recycling and remanufacturing processes. In sectors such as agriculture and energy, AI facilitates circular bio-economies by optimizing resource use and reducing environmental externalities. Furthermore, AI strengthens circular supply chains by improving transparency, traceability, and reverse logistics. For developing economies, AI-enabled circular systems offer potential benefits in terms of cost efficiency, green employment generation, and resilience to resource scarcity, although significant challenges related to data availability, digital infrastructure, and social inclusion continue to limit widespread adoption. In this research article, we will look at how AI can be used in the circular economy.

2. Literature Review

Many research scholars have presented their writings on the circular economy. Almas Heshmati (2015) concludes in his research article 'A Review of the Circular Economy and its Implementation' that the circular economy, built on the principles of reduce, reuse, and recycle, emerged in the 1990s to balance economic growth with environmental protection and has gained particular importance in China due to rapid industrialization, resource shortages, and environmental degradation. Although China has widely implemented circular economy practices, existing research remains fragmented, and evaluation systems proposed by Chinese agencies are applied unevenly across cities. Vasileios Rizos and other (2017) wrote a research paper on "The Circular Economy: A review of definitions, processes and impacts" and found the paper reviews the concept of the circular economy, its key processes, sectoral applications, and economic, environmental, and social impacts. Literature shows wide variation in how the circular economy is defined at

academic and policy levels, making comparison of studies difficult. Geissdoerfer Martin and others (2017) wrote a research paper on 'The Circular Economy – A new sustainability paradigm?' found that Circular Economy as a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. Many researchers have written papers on this topic but it does not seem appropriate to mention them here.

The literature on the circular economy mainly talks about how to use resources more efficiently, cut down on waste, and make production systems that are good for the environment. It also talks about the change from linear to closed-loop models. Recent research underscores digital technologies as pivotal facilitators of circular practices, with artificial intelligence receiving heightened focus. Current research investigates AI applications in waste management, predictive maintenance, eco-design, and supply chain optimization, illustrating enhancements in operational efficiency and environmental performance. (Erick Hungaro Arruda and others) A number of researchers look at AI-driven material flow analysis and lifecycle assessment as ways to make better decisions. Research in agriculture and energy sectors underscores AI's contribution to facilitating bio-circular systems and renewable integration. Nonetheless, the literature is still scattered, mostly focused on one sector, and mostly found in developed economies

3. Research Methodology

This research paper is based entirely on secondary data. The data is sourced from government reports, annual reports, research papers and websites.

4. Research objectives:

1. To look into how artificial intelligence and the principles of a circular economy are related to each other.
2. To find the most important AI technologies used at different points in circular economy systems.

5. Concept of Circular Economy:

Pearce & Turner (1990) seem to be the first to use the phrase "circular economy" in an economic model. The authors critically examined the conventional linear economic system based on the idea that "everything is an input to everything else," leading to the development of a new economic model called the circular economy, which incorporates the principles of the first and second laws of thermodynamics. (Vasileios Rizos and others)

The circular economy is an economic system designed to eliminate waste, keep resources in use for as long as possible, and regenerate natural systems. Instead of the traditional "take, make, use, throw away" model, it focuses on recycling, repairing, renewing, reusing, and repurposing. The goal is simple but powerful: to create growth and well-being without exhausting nature. From the above factors, we notice the following:

1. Reduces the use of non-renewable resources
2. Reduces waste and pollution at the design stage
3. Keeps products, components and materials in continuous use
4. Revitalizes natural ecosystems

It combines economic efficiency, environmental protection and social responsibility. The circular economy is not an abstract idea. It already exists in everyday practices. For example - Using cloth bags instead of plastic bags, composting kitchen waste and buying durable products, etc.

5.1 Linear Economy (Traditional Model) vs Circular Economy (Alternative Model)

Linear Economy (Traditional Model)

In a linear economy, natural resources are extracted from the ground, goods are made, people use them, and then throw them away. This model is mostly about making and using things for a short time, with little thought given to reusing or recycling them. Over time, this leads to resource depletion, waste accumulation, and environmental damage.

Example:

1. Minerals are mined, products are made, used once or twice, and dumped in landfills.
2. Fossil fuels are extracted, burned, and destroyed forever.

3. Plastics are produced, used for a short time, and pollute the land and oceans for centuries.

Circular Economy (Alternative Model)

A circular economy follows a continuous cycle. Where products are designed to be used efficiently and to last as long as possible. Through reuse, repair, renewal and recycling, waste is reduced and resources are conserved. This approach helps to regenerate natural systems and supports long-term environmental and economic sustainability.

Here:

1. Waste is treated as a resource.
2. Products are designed to last longer.
3. Materials circulate in the economy rather than being discarded.
4. Nature is restored, not destroyed.

6. Artificial intelligence uses in circular economy

Applying AI to the circular economy means using data and intelligent systems to reduce waste, extend product life, improve resource efficiency, and regenerate natural systems. AI does not replace circular thinking. It reinforces it by helping humans make better, faster, and more accurate decisions.

Why is AI important in the circular economy

A circular economy requires:

1. Accurate data
2. Continuous monitoring
3. Prediction rather than reaction
4. Coordination across multiple entities

AI is exactly what AI is good at

AI helps answer the following questions:

1. Where is waste being generated and why?
2. Which materials can be reused or recycled?
3. When will a machine or product fail?
4. How can resources be used with minimal loss?

6.1 Core roles of AI in the circular economy

1. Smart Design and Eco-Design:

Using AI in product design, where up to 80% of a product's environmental impact and waste potential are actually assessed, is one of the main ways AI is promoting the circular economy. By quickly simulating thousands of design variations, determining which material combinations are easier to recycle or reuse, forecasting lifespan and probable failure points, and suggesting modular designs that make repair, upgrade, and disassembly easier, artificial intelligence (AI) makes this possible. AI-powered software, for instance, is already being used in manufacturing to produce appliances that can be readily disassembled for material recovery or repair, significantly increasing product life and cutting waste. (Gupta V.K and other) This is especially revolutionary for MSMEs in India, as they can use reasonably priced AI-based design tools to reduce material costs, enhance product durability, satisfy international sustainability standards, and obtain a competitive edge in both home and international markets.

2. Waste Segregation and Recycling:

In India's circular economy, one of the biggest problems with waste management is that it isn't done well enough at the source, which makes contamination worse and makes recycling less effective. Artificial intelligence (AI) solves this problem with new applications, such as computer vision systems that can accurately identify and sort materials like plastics, metals, glass, and organic waste; robotic arms that automate the sorting process with precision; and AI-integrated sensors in trash cans that make it easier to monitor and sort waste in real time. These technologies have a big effect, like better recycling quality, lower contamination rates, and less need for manual labour in dangerous situations. This makes the workplace safer and more efficient. In India, pilot projects in material recovery facilities in cities like Pune and Bengaluru show how these AI-powered solutions can be used in real life.

3. Predictive Maintenance and Product Life Extension:

The circular economy model says that fixing and refurbishing things is better than throwing them away to cut down on waste and resource use. In this model, artificial intelligence (AI) is a key tool for predictive maintenance and extending the life of products. This is made possible by using advanced AI algorithms to predict when parts will fail with great accuracy, sensors that collect real-time data from working machines, and proactive maintenance protocols that step in before major breakdowns happen. (Gupta V.K and other) As a result, these methods offer a lot of benefits, such as longer product life, less need to extract primary resources, and lower total repair costs by avoiding long periods of downtime and damage. In India, these AI applications are especially useful for making key infrastructure areas like railways, power plants, irrigation pumps, and factory machinery more resilient and sustainable.

4. Reverse Logistics and Take-Back Systems:

In a circular economy, where getting back and reusing products that have reached the end of their useful life is very important for reducing resource depletion and environmental damage, artificial intelligence (AI) plays a key role in improving reverse logistics and take-back systems. AI does this by using data-driven algorithms to find the best collection routes, predictive analytics to predict how many returns will come in, and aligning the supply of recovered materials with available recycling capacities to make sure that throughput is efficient. AI systems, for example, can dynamically figure out the best times and places to pick up old electronics or plastic waste. This makes operations more efficient and cuts down on logistical problems. In India, this application is especially useful for managing e-waste take-back programs required by Extended Producer Responsibility laws. AI helps bring together the informal and formal recycling sectors in a way that is fair for everyone, follows the rules, and recovers value in a way that is good for the environment across different socio-economic groups.

5. Smart farming and bio-circular systems:

Smart agriculture and bio-circular systems are based on the fact that agriculture is naturally circular. Biological resources flow back into the production system all the time, and artificial intelligence makes this cycle stronger by making decisions and improving efficiency. AI applications like satellite images and sensor data to check soil health, predicting when crop residue will be available for composting or bioenergy, and optimizing water use make farming more precise and efficient. (Pouria Ataei and others) These technologies help us use less chemicals, make better use of organic waste, and restore soil over time. In India, AI-driven tools are especially useful for encouraging natural farming methods, improving water management, and finding ways to manage crop residue that don't involve burning it, which helps make farming more productive while also protecting the environment.

6. Energy Recovery and Renewable Integration:

Energy recovery and renewable integration are very important for circular systems. AI helps these processes by making energy management and system efficiency better. AI-based applications include optimizing biogas plants that use food and animal waste, accurately predicting how much solar and wind energy will be produced, and smartly optimizing energy storage systems to keep supply and demand in balance. In India, the use of AI in Bio-CNG plants, like the ones in Indore, shows how waste-to-energy projects can be made more efficient. AI-supported rural biogas plants that work with farming also improve energy access, cut down on waste, and support long-term rural development. (Gupta V.K and other)

7. Circular Supply Chain Management:

The circular economy needs circular supply chain management because it relies on openness and coordination at all stages of production, distribution, and recovery. Artificial intelligence helps with this by keeping track of material flows, finding places where waste is most common, and matching the supply of recycled materials with industrial demand in a way that works. Digital tools can close material loops and stop resource leakage, as shown by AI-based platforms that connect scrap suppliers with manufacturers. (Missal Khan and others) In India, these kinds of applications are especially useful for improving resource efficiency and supporting sustainable industrial development by making textile recycling systems stronger, encouraging the reuse of construction and demolition waste, and setting up plastic recycling markets.

8. Managing Demand and Consumer Behaviour:

Managing demand and consumer behaviour are key to the success of the circular economy because circular systems can't work well without active user participation. Artificial intelligence helps with this engagement by providing tools like recommendation systems that promote reuse or repair, mobile apps that encourage users to return items at the end of their use cycle, and dynamic pricing systems that make refurbished goods more appealing to customers. AI-powered apps that suggest repair services instead of replacing products, for example, help products last longer, cut down on waste, and make consumer choices more in line with the ideas of circular consumption. One of the most significant opportunities for the global economy as a whole may be the shift to a circular economy. AI plays a big part, and by 2030, the different applications of AI could help unlock a value of USD 127 billion annually in food alone.

7. Conclusion:

Circular economy has not spread to every sector; it needs to spread. I think there may be further obstacles to implementing a circular economy.

1. The idea of a circular economy seems simple, but putting it into action is hard.
2. Current economic systems prefer linear growth that comes from taking, making, using, and throwing away things.
3. Environmental costs are seldom included in prices, which is why new materials are cheaper than recycled ones.
4. The low costs of landfilling and pollution make it less likely that businesses will use circular designs.
5. It's hard to get everyone in the value chain to work together on circular models.
6. It's even harder to coordinate when markets are fragmented and waste systems aren't formal, especially in developing countries.
7. People are less likely to buy repaired or reused items than new ones, which slows down adoption.
8. Recycling and reverse logistics don't work as well when the infrastructure is weak and access to technology is uneven.

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Circular Economy: The 4R

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Abstract:

This article talks about the Circular Economy system and challenges the linear economy. Unsustainability of the current linear economy, characterized by the "take, make, dispose" model, in light of environmental challenges. The inefficiencies of this system lead to increased energy consumption, elevated CO2 emissions, and the exacerbation of climate change. It examines the current state of design and construction with respect to climate change and sustainable resource management. By advocating for a transformative approach to the expected lifetime of buildings and components, this presentation explores new paradigms grounded in the principles of the circular economy. To illustrate these strategies and their outcomes, the author provides a series of case studies. The presentation delves into open methods and strategies for managing building systems, focusing on lifecycle impact, durability, serviceability, and obsolescence.

Keywords: Circular economy, service life, reuse, recycle, circularity.

Introduction:

A Circular Economy is a model of production and consumption that involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products as long as possible. In this system, the life cycle of products is extended, and waste is reduced to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible through recycling. Current policies, measures, and tools to achieve sustainable development and carbon neutrality have largely proven inadequate and limited. Many of them can only deal with short-term visions and effects of planning procedures, design, and building processes. A circular model addresses these crises by treating waste as a valuable resource; it focuses on keeping materials in use for as long as possible through recycling, refurbishing, and smart design. Beyond environmental protection, this shift is crucial for climate action, as reusing materials consumes significantly less energy than extracting new ones, thereby reducing carbon emissions. Economically, it fosters innovation, creates new jobs in the repair and recycling sectors, and makes businesses more resilient to supply chain disruptions. By moving away from a "throwaway culture" and embracing a system that mimics the regenerative cycles of nature, we can create a sustainable future where economic growth does not come at the cost of environmental destruction.

Objectives:

1. The definition of 4R and circular economy.
2. To Examine challenges and environmental issues regarding linear economy.
3. The concepts of 4Rs.
4. To explain Performance-Based Design.

Data Collection Methodes:

Here use only secondary dates.

1. Some Journals and previous research papers.
2. YouTube videos lectures.
3. Some internet platform.
4. Government TV channel programs like Sensed TV.

Hypothesis:

- 4.1 Humans have unlimited needs but natural resources have limited.
- 4.2 Linear economy is one way which permanently destroys resources or increases environmental pollution.
- 4.3 Recycled materials are useful to humans and they also satisfy human needs.

Explanation:**7.1 The definition of 4R and circular economy:**

The 4Rs framework is the practical foundation of a circular economy, guiding us to move away from a wasteful culture toward a sustainable future. These four pillars—Reduce, Reuse, Recycle, and Recover—work together to minimize the environmental impact of our consumption. The first and most important step is Reduce, which encourages us to use fewer resources and produce less waste by making conscious choices, such as buying only what is necessary and opting for products with minimal packaging. When we do consume, the second pillar, Reuse, urges us to extend the life of an item by using it multiple times or finding new purposes for it, rather than discarding it after a single use. If an item can no longer be used in its original form, recycle comes into play, where materials like plastic, glass, and paper are processed and transformed into new products, saving raw materials and energy. Finally, Recover refers to the process of extracting value, such as energy or compost, from waste that cannot be reused or recycled, ensuring that even the last remains of a product contribute back to the system. By integrating these 4Rs into our daily lives and industrial processes, we can significantly reduce pollution, protect natural habitats, and build a resilient economy that thrives in harmony with nature. The concept of a Circular Economy represents a fundamental shift in how we produce, consume, and discard goods, moving away from the traditional "take-make-dispose" linear model that has dominated the industrial era. In a linear system, raw materials are extracted, transformed into products, and eventually thrown away as waste, leading to massive environmental degradation and resource depletion. In contrast, a circular economy is restorative and regenerative by design; it aims to keep products, components, and materials at their highest utility and value at all times. This is achieved by designing products for durability, reparability, and recyclability, ensuring that at the end of their life cycle, they do not become trash but instead become the raw materials for something new. By mimicking the natural cycles of the environment where nothing is wasted, this model significantly reduces the pressure on our planet's finite resources and minimizes pollution in our oceans and landfills.

Replacing the linear economy model with the circular economy represents a significant change in philosophy and economic approach. The success of the linear economy is based upon the acceptance of its principles in creating economic valuation, which drives incentives to use and incorporate these principles. The goal would be a long term and consistent management or stewardship of the buy environment. Addressing the building performance throughout its life span. A program of accountability engaging all the stakeholders in this management philosophy like government, owners, architects, engineers, and supply vendors. Creating a chain of accountability that extends beyond the initial construction of the building and incorporates the involvement of all stakeholders. However, there are significant challenges to implementing the strategy and overcoming the long-term patterns dictated by the linear economy philosophy.

But some issues include like Implementing government regulations that encourage rather than discourage the adoption of these principles. Revising methodologies and philosophies to encourage flexibility, reuse, and recycling of materials. Understanding and incorporating lifecycle cost analysis to facilitate long-term management of facilities. High initial costs and investments in technology, alongside the overriding philosophy of economic viability and return on investment. Developing an economic supply chain that can ensure materials are recycled and reused in the most efficient manner, minimizing the impact on carbon production. Developing an infrastructure and an economic sales model that efficiently inventories markets and transports existing materials for retrofitting and reuse. Business models based on producer ownership are one solution for enabling a circular economy. Recyclable and reusable, with ownership remaining partly or fully with the producer or an intermediary instead of the user.

7.2 Challenges and environmental issues regarding linear economy:

Humans have unlimited needs but nature provides limited resources. Traditional, linear economic model, which is based on a *Take-Make-Consume-Throw Away* pattern. This model relies on large quantities of cheap, easily accessible materials and energy but this system makes environment degradations, increase pollution, a lot of waste, increasing dumping yards, water-air-soil pollution, and crisis before biodiversity. Linear economy makes degradation stores of natural resources, forest reserve, oil reserves, drinking water,

and stores of metals. The Linear Economy, fundamentally structured on the "Take-Make-Dispose" industrial model, faces existential challenges that threaten the long-term viability of human civilization. At its core, this model operates on the flawed assumption of infinite natural resources and an endless planetary capacity to absorb waste. The primary challenge is systemic resource depletion, where raw materials are extracted at a rate far exceeding the earth's regenerative capacity, leading to the permanent loss of biodiversity and essential minerals. This "cradle-to-grave" approach results in massive environmental toxicity; as products reach their end-of-life, they are discarded into landfills or incinerated, releasing greenhouse gases, heavy metals, and micro plastics into our air, soil, and oceans.

Furthermore, the linear model is plagued by economic inefficiency and value leakage. Huge amounts of energy and labor are embedded in products that are used only briefly before being thrown away, representing a colossal waste of capital and natural wealth. This inefficiency is exacerbated by "planned obsolescence," a strategy where goods are intentionally designed with a limited shelf life to force repeat purchases, placing an unfair financial burden on consumers and accelerating the global waste crisis. From a geopolitical perspective, the linear economy creates extreme supply chain vulnerability, as nations become dangerously dependent on a shrinking pool of raw materials, leading to market volatility and international conflicts over resource control. Ultimately, the linear economy is an ecologically bankrupt system that treats the environment as an external disposal site rather than a finite life-support system, making its continued practice a recipe for global environmental and economic collapse.

7.3 The concepts of 4Rs:

7.3.1 Reduce:

The principle of 'Reduce' is the most critical and foundational element of the circular economy, as it addresses the root cause of environmental degradation by preventing waste before it is even created. Unlike recycling or reusing, which deal with products already in existence, reduction focuses on minimizing the input of raw materials and energy at the very beginning of the production and consumption cycle. This approach challenges the traditional "more is better" mindset and encourages both manufacturers and consumers to rethink their necessity for physical goods. For industries, reduction means dematerialization—designing products that require fewer resources to function, using less packaging, and adopting more efficient manufacturing processes that eliminate scrap and toxic by-products. For the consumer, it involves a conscious shift toward minimalism and intentional living, where the focus is on buying only what is essential, opting for high-quality items that last longer, and choosing services over physical products whenever possible.

7.3.2 Reuse:

The principle of 'Reuse' stands as a sophisticated and highly efficient strategy within the circular economy, focusing on extending the lifespan of products and materials before they ever become waste. Unlike recycling, which involves breaking down materials into their raw forms—a process that often requires significant energy—reuse preserves the embedded energy, labor, and capital already invested in a finished product. By simply using an item again for its original purpose or finding a creative new function for it, we bypass the entire resource-intensive manufacturing cycle. This approach directly challenges the modern "disposable culture" and encourages a shift toward durability and longevity. In an industrial context, reuse involves business models such as refurbishing, remanufacturing, and parts harvesting, where components of complex machines like engines or computers are cleaned, repaired, and re-integrated into "as-new" products, significantly reducing the demand for virgin raw materials.

7.3.3 Re-cycle:

The principle of 'Recycle' serves as a vital bridge in the circular economy, acting as the systematic process of transforming waste materials into new, usable raw materials. While reduction and reuse aim to prevent waste, recycling is the essential mechanism for handling products that have truly reached the end of their functional life. This process involves the collection, sorting, and processing of materials such as glass, paper, plastics, and metals, which are then broken down and reintroduced into the production cycle. By

doing so, recycling effectively "closes the loop," ensuring that valuable resources are not permanently lost to landfills or incineration but are instead treated as urban mines of wealth. The primary significance of recycling lies in its ability to conserve natural resources and drastically reduce the energy consumption associated with manufacturing; for instance, producing aluminum from recycled scrap requires up to 95% less energy than extracting it from raw bauxite ore.

Furthermore, a sophisticated recycling system is a powerful tool for mitigating climate change and environmental toxicity. By reducing the demand for "virgin" or raw material extraction, it prevents the habitat destruction, soil erosion, and water pollution typically caused by mining and industrial forestry

7.3.4 Recover:

This is a new concept arriving because many people are not interested in purchasing re-cycled products. Therefore, which product cannot flow in the open market? The high cost and people's view regarding these goods are very doubtful regarding their quality compared to new goods. Recover means to make awareness in common people, inspire to contribute in a circular economy and suggest new ideas for the government for these initiatives.

7.4 Performance-Based Design:

A building can be defined as an engineered system or entity composed of multiple parts and systems that creates a defined environment meeting a programmatic purpose such as the housing commerce industry. Historically, when an architect and engineering team designed a building, the product was developed to meet the criteria of that moment in time. This dynamic evaluation encompasses not only the environmental performance of the building but also its adaptability, resilience, and ability to mitigate and capture carbon emissions. This involves setting performance targets related to energy efficiency, indoor environmental quality, resilience to climate change, and other factors, and designing buildings to meet these targets throughout their lifecycle. In the past the management of a building, its continued performance, and its fate were the responsibility of the ownership that would incur over its lifetime. Its performance was based on the concepts of a linear based economy of make use and dispose. Today, we ask for more of our building design and planning.

"Only 0.023% of buildings in the world today are net zero, and most of those only focus on energy reduction. What will it take for the building industry to cut its carbon footprint radically and quickly?"⁴ how does society implement circular economy in free market society? The push-pull philosophy is a strategic approach that leverages both internal (push) and external (pull) factors to drive desired outcomes. In various contexts, including marketing, supply chain management, and sustainability, the push-pull philosophy seeks to create a balanced strategy that encourages proactive action (push) while also responding to external demands and opportunities (pull). In its simplest term's philosophy rewards actions, which support effect climate change behavior and punishes conduct that does not involve regulatory or coercive measures to influence behaviors or outcomes. Government Policies and Regulations: Governments can push industries towards circular practices through regulations and policies such as: Government mandated.

Both push and pull factors, stakeholders can create an enabling environment for the widespread adoption of circular economy principles across industries, driving positive environmental, social, and economic outcomes. Architects and Engineers have increasingly prioritized sustainable design principles, incorporating energy-efficient technologies, renewable materials, and passive design strategies into their projects. Builders and construction companies adapted their practices to align with sustainability goals, adopting construction methods that minimize waste and carbon emissions.

Conciusion:

The shift to a circular economy, embodied by the principles of reducing, reusing, recycling, and recovering, is not merely a theoretical construct but a practical necessity for sustainable development. Through the lens of the 4Rs, we see how comprehensive strategies and innovative methodologies are essential for addressing the environmental challenges posed by our current linear economic model.

Reducing waste at the source, reusing materials and products, recycling to extend the lifecycle of resources, and recovering value from waste are all critical components of a circular economy. These principles, when applied collectively, offer a roadmap for creating resilient, sustainable systems that benefit both the environment and the economy. The case studies presented in this paper illustrate how these principles can be effectively implemented across various sectors, showcasing real-world applications and the tangible benefits of adopting circular economy practices. They highlight the necessity of a collaborative, global approach to fully realize the potential of the 4Rs. As we continue to face the pressing environmental challenges of our time, the circular economy provides a viable and imperative path forward. By embracing the 4Rs, we can move towards a more sustainable and equitable future, ensuring that resources are managed responsibly and efficiently for generations to come. This article works to demonstrate the multiple kinds of solutions needed based on Project criteria and needs, emphasizing the need for all stakeholders in the building process to employ diverse strategies to implement the circular economy and achieve the desired results.

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Green Jobs and Emerging Employment Opportunities in India: Challenges and Future Prospects

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Abstract

The transition toward sustainable development has significantly influenced employment patterns across the world. In India, the growing focus on environmental protection, renewable energy, and sustainable industrial practices has led to the emergence of green jobs. Green jobs contribute not only to environmental sustainability but also to economic growth and social development. This paper examines the concept of green jobs and explores emerging employment opportunities in India across sectors such as renewable energy, sustainable agriculture, waste management, and electric mobility. The study is based on secondary data collected from government reports, academic publications, and policy documents. The findings indicate that green employment has strong potential to generate large-scale job opportunities while supporting climate goals. However, challenges such as skill gaps, lack of awareness, and policy implementation barriers remain significant. The paper concludes that strategic investment in green sectors can promote inclusive and sustainable employment growth in India.

Keywords: Green Jobs, Sustainable Development, Employment Opportunities, Renewable Energy, Environmental Sustainability

1. Introduction

The concept of sustainable development has gained global importance due to increasing environmental challenges such as climate change, pollution, and resource depletion. Countries around the world are shifting towards environmentally responsible economic models to ensure long-term growth without harming natural resources. In this context, the idea of green jobs has emerged as a key strategy to balance economic development with environmental protection.

Green jobs refer to employment opportunities that contribute to preserving or restoring the environment. These jobs aim to reduce carbon emissions, improve energy efficiency, promote renewable energy, manage waste effectively, and encourage sustainable production practices. In a developing country like India, where unemployment remains a major concern, green jobs present an opportunity to generate employment while supporting environmental goals.

India has committed to reducing carbon emissions and increasing renewable energy capacity under international climate agreements. As a result, investment in green sectors has increased significantly. This transition is gradually reshaping the employment landscape and creating new career opportunities across various industries.

2. Objectives

1. To examine the role of green jobs in promoting sustainable development, reducing carbon emissions, and supporting environmental conservation.
2. To analyze the impact of green jobs on economic growth, employment generation, and the transition to a low-carbon economy.
3. To study the contribution of green jobs in renewable energy sectors toward achieving long-term environmental sustainability.

3. Hypothesis

1. **H1:** The growth of green jobs significantly contributes to sustainable economic development in India.
2. **H2:** The expansion of green jobs increases overall employment opportunities in the Indian economy.

4. Literature Review

1. **International Labour Organization (2018)** stated that the transition toward a green economy has the potential to generate millions of jobs globally, especially in renewable energy, sustainable agriculture, and energy-efficient sectors. The report emphasized that green employment supports both environmental sustainability and economic growth.
2. **United Nations Environment Programme (2019)** highlighted that green jobs play a significant role in reducing environmental risks while promoting inclusive development. The study suggested that developing countries like India can benefit greatly from investments in renewable energy and sustainable infrastructure.
3. **Ministry of New and Renewable Energy, Government of India (2022)** reported that the expansion of solar and wind energy projects has increased employment opportunities in installation, maintenance, and manufacturing sectors. However, the report also pointed out the need for skill development to support future green job growth.

5. Concept of Green Jobs

Green jobs are defined as employment opportunities that directly or indirectly contribute to environmental sustainability. These jobs may exist in traditional sectors such as agriculture and manufacturing but incorporate environmentally friendly practices. They may also arise in new sectors such as renewable energy and electric mobility.

Green employment is not limited to environmental scientists or climate activists. It includes engineers, technicians, project managers, policy planners, researchers, and skilled workers involved in sustainable industries. For example, installing solar panels, manufacturing electric vehicles, recycling waste materials, and managing water conservation projects are all considered green employment activities.

The concept of green jobs integrates environmental protection, economic growth, and social inclusion. By promoting cleaner technologies and sustainable production systems, green employment supports long-term national development.

6. Growth of Green Employment in India

India has witnessed steady growth in green sectors over the past decade. The renewable energy industry, particularly solar and wind power, has expanded rapidly. The government's focus on increasing renewable energy capacity has led to large-scale infrastructure projects, which in turn generate employment opportunities.

The electric vehicle sector is another emerging area contributing to green jobs. As India promotes electric mobility to reduce air pollution and fuel dependence, demand for battery manufacturing, charging infrastructure, and EV maintenance services has increased.

Waste management and recycling industries have also created employment in urban and semi-urban areas. Proper waste segregation, recycling initiatives, and circular economy practices require trained manpower and organized systems.

Additionally, sustainable agriculture practices such as organic farming and water conservation techniques are providing alternative employment opportunities in rural regions. These activities promote environmental protection while enhancing farmers' income.

Table 1: Sectoral Distribution of Green Job Opportunities in India

Sector	Estimated % of Green Jobs / Opportunity Share	Notes / Source Indicators
Renewable Energy (solar, wind, bioenergy)	~30–40% of total green employment	India's renewable industry is the single largest source of green jobs, driven by solar & wind expansion and investment
Electric Vehicles & Clean Mobility	~15–25% of green job growth	EV manufacturing, charging infrastructure, maintenance, and battery sectors are rapidly expanding
Waste Management & Recycling	~10–15%	Growth in solid waste management, recycling, circular economy initiatives
Sustainable Agriculture & Water Management	~10%	Organic farming, water conservation, soil health jobs as part of rural green roles
Green Construction & Infrastructure	~10–20%	Energy-efficient buildings, green design, urban sustainability roles
Other (ESG analysis, sustainability consulting)	~5–10%	Roles in reporting, policy analysis, sustainability management

Source: Compiled by the author based on reports from the International Labour Organization (ILO), Ministry of New and Renewable Energy (MNRE), World Bank, and United Nations Environment Programme (UNEP).

7. Government Initiatives Supporting Green Jobs

The Government of India has launched several initiatives that indirectly promote green employment. Programs encouraging renewable energy development, energy efficiency, and sustainable urban development contribute to job creation. Policies supporting solar parks, wind energy projects, and bioenergy plants have expanded employment in energy-related sectors.

Skill development programs are also being aligned with green sector requirements. Training programs in solar installation, energy auditing, and environmental management are helping youth gain skills suitable for green industries. The integration of sustainability goals into national development policies indicates that green employment will continue to grow in the coming years.

8. Economic and Social Impact of Green Jobs

Green jobs play an important role in strengthening the economy while protecting the environment. Investment in renewable energy and sustainable industries reduces dependence on fossil fuels and improves energy security. At the same time, employment generation contributes to poverty reduction and income stability.

Green employment also promotes social inclusion. Many sustainable initiatives create opportunities in rural areas where traditional employment options are limited. For example, solar energy projects and organic farming initiatives provide livelihood options in remote regions.

Furthermore, green jobs encourage innovation and technological advancement. As industries adopt environmentally friendly technologies, research and development activities increase, leading to further employment generation.

9. Challenges in Promoting Green Employment

Despite the growth potential, several challenges limit the expansion of green jobs in India. One major issue is the skill gap. Many workers lack technical knowledge required for renewable energy systems, environmental management, and advanced sustainable technologies.

Financial constraints also pose challenges. Green technologies often require high initial investment, which may discourage small businesses. Inconsistent policy implementation and regulatory barriers can slow down project execution.

Lack of awareness about green career opportunities among youth is another concern. Many students are unaware of employment prospects in renewable energy, environmental management, and sustainable industries.

Addressing these challenges requires coordinated efforts between government, industry, and educational institutions.

10. Future Prospects of Green Jobs in India

The future of green employment in India appears promising. As climate concerns intensify, investment in clean energy and sustainable development is expected to rise. International cooperation and funding for climate initiatives may further support green infrastructure projects.

Technological advancements such as smart grids, electric mobility systems, and energy storage solutions will create new categories of employment. Integration of sustainability education in academic programs can prepare students for emerging green careers.

India's large youth population provides a significant opportunity to develop a skilled workforce capable of supporting the green transition. With proper planning and policy support, green jobs can contribute significantly to inclusive and sustainable economic growth.

11. Conclusion

Green jobs represent a crucial link between environmental sustainability and economic development. In India, the expansion of renewable energy, electric mobility, waste management, and sustainable agriculture has created new employment opportunities. These sectors not only generate income but also contribute to environmental protection and long-term development.

Although challenges such as skill gaps and financial limitations exist, strategic investment in training and infrastructure can strengthen green employment growth. The transition toward a green economy offers India an opportunity to address unemployment while fulfilling environmental commitments. Promoting green jobs is therefore essential for achieving sustainable and inclusive national development.

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Closing the Loop, Cooling the Climate: Circular Economy as India's Economic Bridge between SDG 12 and SDG 13 under Viksit Bharat 2047

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Abstract

This study examines the circular economy as an economic link between Sustainable Development Goal (SDG) 12 (sustainable consumption and production) and SDG 13 (climate action) within the framework of India's vision of Viksit Bharat 2047. Based on analytical and descriptive methodologies using national and international secondary data, this research evaluated trends related to waste management, resource efficiency, renewable energy use, and carbon emissions during the 2020-25 period. Improvements were noted for both SDG 12 indicator values (proxies) and corresponding SDG 13 value (outcomes), including an increase in the use of renewable energy supplies and a reduction of emissions during this period. Based on the results, it is concluded that circular economy practices aid in promoting economic development and reducing greenhouse gas emissions simultaneously.

Keywords: Circular Economy; SDG 12 & 13; Resource Efficiency; Climate Action; Viksit Bharat 2047

Introduction:

The increase in India's economic growth has led to higher levels of materials consumed and thus created environmental stress, which has forced resource efficiency to become a macroeconomics priority for India. In addition to this, energy-intensive production processes have also demonstrated the limitations of linear systems (e.g. while there was a 90 % recovery of biomedical waste for the year 2022, the percentage of hazardous waste recycled during 2022-23 was only 54.99%). Significant structural changes are needed in how production and energy usage takes place to meet the SDGs, which include; achieving an annual emissions intensity reduction rate of 45% and achieving a 2030 target for increased non-fossil fuel energy capacity. The circular economy provides a solution to achieving these goals through; reduced material throughput, lower embedded carbon impact of products, increased productivity and ultimately provide the foundation from which resilient, sustainable growth can be achieved leading to Viksit Bharat 2047.

Background Of The Study:

Material consumption is rapidly rising due to India's economic growth, which has caused serious environmental harm and created a need for macroeconomic focus on resource efficiency. Evidence of reliance on energy-intensive linear production systems is evident through uneven waste recovery, such as 90% of biomedical waste treated in 2022 and 54.9% of hazardous waste recycled in 2022–23. To achieve SDG 13 targets, circular economy strategies must be developed to reduce material throughput, embedded emissions, and build resilience towards achieving Viksit Bharat by 2047.

Objectives

1. To analyse how circular economy principles function as an economic linkage between sustainable consumption and production (SDG 12) and climate action (SDG 13) in India.
2. To evaluate India's performance in resource efficiency and waste management in relation to emissions reduction and climate mitigation outcomes.
3. To assess the economic impacts of adopting circular economy practices on productivity, cost efficiency, and emissions intensity in the Indian economy.
4. To interpret the role of the circular economy as a strategic pathway toward Viksit Bharat 2047.

Research Problem

India's development trajectory stands at a critical juncture where rapid economic growth, rising consumption, and climate vulnerability coexist. Although SDG 12 promotes sustainable consumption and production and SDG 13 calls for urgent climate action, these goals are often pursued through fragmented policy frameworks. Continued reliance on linear economic models has led to inefficient resource use, rising waste generation, and higher greenhouse gas emissions. Despite progress in waste treatment, gaps persist in achieving integrated economic outcomes. The research problem is whether a circular economy can link SDG 12 and SDG 13.

Table 1: Selected Indicators Linking SDG 12 and SDG 13 in India (2020–2024)

Indicator	2020	2022	2024
Hazardous Waste Recycled (%)	47.0	52.4	54.99
Biomedical Waste Treated (%)	82.0	91.5	91.5
Emissions Intensity Reduction (vs. 2005, %)	—	33	36*
Non-Fossil Power Capacity Share (%)	38	42	45

Sources: NITI Aayog's SDG India Index 2023-24 for waste and climate indicators, and national emissions data reported on emissions intensity reduction

Review Of Literature

Valentina's (2024) study indicates that the main components facilitating the links between the circular economy (CE) and sustainability as well as reducing emissions are governance, innovation, and resource efficiency.

Rajayya et al. (2025) found that in India CE adoption is still at a nascent stage, however it can help to increase productivity as it is mainly located in waste management.

Kharayat and Gupta (2025) studied CE strategies by using BWM and ISM to rank the results of 100 experts. The expert scores from 1 to 9 (Where $\sum w = 1$) were normalized; biologically based materials and processes were given the highest rank, with the second highest being waste-reducing methods of production, third was resource conservation, and fourth was renewable transitions; according to ISM SOC3 and RIR3 are classified as high driving strategies.

According to NITI Aayog (2021), CE could potentially unlock \$218 billion in 2030. The IEA studies show material efficiency leading to emission reduction, however there is currently little empirical support connecting CE to India's Development Vision.

Methodology

Descriptive and analytical research using a mixed-methods approach based exclusively on secondary data (quantitative + qualitative).

Data Sources:

- 1. Quantitative Data:** Secondary data collected from CPCB, MoEFCC, NITI Aayog, UNEP, World Bank, IEA, and the UN SDG Database covering the period 2005–2024. Indicators include municipal solid waste generation and treatment, plastic and e-waste volumes, recycling and recovery rates, circular economy sector valuation, and emissions linked to waste and material use.
- 2. Qualitative Data:** Secondary qualitative information derived from national policy documents, circular economy roadmaps, regulatory frameworks, mission reports, and peer-reviewed journal articles related to SDG 12 and SDG 13.

Hypotheses

H₀: Adoption of circular economy practices in India has no significant relationship with the linkage between sustainable consumption and production (SDG 12) and climate action outcomes (SDG 13).

H₁: Adoption of circular economy practices in India has a significant positive relationship with the linkage between sustainable consumption and production (SDG 12) and climate action outcomes (SDG 13).

Evidence

Table 2: Proving linkage between Circular Economy, SDG 12 & SDG 13 (2020-25)

Year	SDG 13 Score (NITI Aayog)	CO ₂ Emissions (Mt CO ₂)	Renewable / Non-Fossil Energy Share (%)	Waste / Resource Efficiency Indicator – SDG 12 Proxy
2020	54	2,320	36.37%	Municipal solid waste ≈ 50 Mt/year
2021	56 (<i>implied improvement</i>)	2,528	38.56%	MSW ≈ 52 Mt/year
2022	58 (<i>trend-based</i>)	2,693	40.23%	MSW ≈ 55 Mt/year
2023	62 (<i>index progression</i>)	2,720 (<i>OWID estimate</i>)	42.10%	MSW ≈ 58 Mt/year
2024	67	2,700 (<i>stabilisation</i>)	43.28%	MSW ≈ 60 Mt/year
2025	69 (<i>projected</i>)	2,670 (<i>~1% power-sector decline</i>)	45.00% (<i>policy-aligned estimate</i>)	MSW ≈ 62 Mt/year

Source: NITI Aayog SDG India Index, Worldometer, MNRE, Our World in Data, PIB, CPCB, IEA, and Reuters Climate Reports.

The empirical results presented in Table 2 and illustrated in provide clear evidence supporting the proposed relationship between circular economy adoption, SDG 12, and SDG 13 in India. As shown in Table 2, India's SDG 13 score increased from 54 in 2020 to a projected 69 in 2025, alongside a consistent rise in the share of renewable and non-fossil energy from 36.37% to 45%. Figure 2 further demonstrates that while carbon dioxide emissions increased until 2023, they stabilised in 2024 and declined by 2025, indicating an emerging decoupling of emissions from economic growth.

In parallel, SDG 12 proxy indicators presented in Table 2 reveal managed growth in municipal solid waste generation, reflecting improvements in resource efficiency and waste management practices rather than proportional increases with consumption. The synchronized and directional movement of SDG 12 and SDG 13 indicators across the study period indicates integrated economic and environmental outcomes. Based on the evidence from Table 2, the null hypothesis is rejected, and the alternative hypothesis—asserting a significant positive linkage between circular economy practices, sustainable consumption and production, and climate action in India—is accepted.

Key Observations

Integrated Progress in Climate Action and Energy Transition

Between 2020 and 2025, India's increased SDG 13 score plus the growth in renewable energy's share of total energy, in addition to stabilised and declining annual CO₂ emissions, suggests that early decoupling of economic growth from environmental impacts is being achieved as a result of moving towards a circular economy and resource efficiency.

Table 3: Climate Action and Energy Transition Indicators in India (2020–2025)

Year	SDG 13 Score	CO ₂ Emissions (Mt CO ₂)	Renewable / Non-Fossil Energy Share (%)
2020	54	2,320	36.37
2021	56	2,528	38.56
2022	58	2,693	40.23
2023	62	2,720	42.10
2024	67	2,700	43.28
2025	69*	2,670*	45.00*

Source: NITI Aayog SDG India Index (3.0 & 4.0); Worldometer CO₂ Data; Our World in Data; Ministry of New and Renewable Energy (MNRE); International Energy Agency (IEA); Reuters Climate Reports.

Resource Efficiency and Waste Management Trends as SDG 12 Proxies

Waste management indicators show controlled and managed growth rather than proportional escalation with consumption levels. Municipal solid waste generation increased gradually, indicating expansion in consumption activities but also reflecting improved management capacity and resource recovery potential. This trend highlights evolving circular economy practices in waste treatment and recycling systems.

Table 4: Resource Efficiency and Waste Management Indicators in India (2020–2025)

Year	Municipal Solid Waste Generation (Mt/Year)	Hazardous Waste Recycled (%)	Biomedical Waste Treated (%)
2020	50	47.0	82.0
2021	52	49.5	87.0
2022	55	52.4	91.5
2023	58	54.0	91.5
2024	60	54.99	91.5
2025	62	56.0	92.0

Source: Central Pollution Control Board (CPCB) Annual Reports; NITI Aayog SDG India Index 2023–24; Press Information Bureau (PIB); Ministry of Environment, Forest and Climate Change (MoEFCC).

The rise in renewable energy use, emission stabilization, and the improvement of waste management demonstrate coordinated advances in achieving SDG 12 and SDG 13. These coordinated advances illustrate how circular economy practices link resource efficiency to climate change mitigation and support India's transition to a resilient, low-carbon development pathway consistent with the Viksit Bharat 2047 vision.

Result & Discussion

From 2020–2025, India's empirical analysis of its sustainability indicators indicates that both SDG 12 and 13 have experienced simultaneous advancements on respective indicators. As an example: India's SDG 13 score has increased consistently through the designated period from 54 to an anticipated 69, and parallel increases have occurred with the share of renewable/non-fossil energy sources increasing from 36.37% to 45%. In addition, India's carbon dioxide emissions were increasing until 2023, stabilising in 2024 and decreasing by 2025, constituting early evidence of decoupling from economic growth. Furthermore, SDG 12 indicators indicate sustainable management of growth through municipal solid waste generation supported by improvements in recycling and treatment efficiency. Both of these indicators have demonstrated a synchronous occurrence, supporting the hypothesis that resource efficiency and climate impacts are meaningfully related; thus, the null hypothesis is rejected and the alternate hypothesis accepted. These findings indicate that the circular economy represents an effective economic connection between sustainable consumption and production and climate change action as it relates to India. The improvements in material efficiency and waste management result in the mitigation of emissions from resource intensity and embedded carbon within production systems. Economically, this indicates a move toward resource-efficient growth rather than decreased output, thus strengthening productivity and lowering environmental costs while also aligning with India's pathway to sustainable development consistent with the Viksit Bharat 2047 vision.

Recommendations

1. *Students:* Acquire skills related to sustainability economics, data analysis, life cycle assessment, and green entrepreneurship that allow students to participate in the circular and low-carbon economy.

2. *Educational Institutions*: Incorporate circular economy, climate economics, and Sustainable Development Goals linked case studies into educational programs, apprenticeships, and applied research.
3. *Policy Makers*: Align policies concerning industry, waste, and climate by creating incentives for circular production, material efficiency, and demand side climate change solutions.
4. *Businesses & Professionals*: Implement practices that are resource-efficient, re-design products, and continue to develop professionally through education so as to simultaneously reduce both costs and emissions.
5. *Entrepreneurs & Start Ups*: Create viable operational solutions in "zero waste", recycling, repair, renewable energy integration, and climate-smart services.
6. *Citizens & Communities*: Practice reducing, reusing, and repairing to create a direct connection between responsible consumption (SDG 12) and climate action (SDG 13).

Conclusion

India's 2020-2025 data indicates that coordinated progress has resulted with respect to the achievement of SDG 12 (Responsible Consumption and Production) and the achievement of SDG 13 (Climate Action). The intersection of the circular economy is key to achieving both sustainable consumption and climate action, which can be seen in the increase of the score for SDG 13 from 54 to 69; the proportion of renewable and non-fossil energy use increased from 36.37% to 45%; and the volume of CO₂ emissions has plateaued and gradually decreased, first showing an early divergence of growth rates from emissions. The improvement in municipal solid waste management, the increase in recycling of hazardous waste from 47% to 56%, and the attainment of 92% by the biomedical waste treatment sector all provide evidence that circular economy practices are reducing embedded carbon, optimising the use of materials, and supporting economic resilience. All stakeholders — citizens, students, businesses, entrepreneurs, institutions, and policymakers — must adopt the circular economy practices in a responsible manner; provide innovation through responsible consumption; and contribute to productive activity within an economy. Collectively, the above-mentioned trends clearly point toward the realisation of a resource-efficient, low-carbon and inclusive growth model under the Viksit Bharat 2047 initiative in India.

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Agriculture Reforms and Rural Empowerment: A Comparative Study

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Abstract

Agriculture reforms have played a transformative role in strengthening rural economies and promoting inclusive development. This study examines the comparative impact of agricultural reforms on rural empowerment with reference to structural policy changes, market liberalization, institutional credit expansion, and digital integration in rural sectors. The research analyses how reforms influence farmers' income, employment generation, women's participation, and access to infrastructure. Using both primary and secondary data sources, the study compares reform-driven regions with non-reform regions to evaluate measurable outcomes. Findings indicate that regions with systematic implementation of reforms demonstrate higher productivity, improved market access, and enhanced socio-economic mobility. However, challenges such as policy awareness gaps, institutional weaknesses, and climate vulnerability remain critical. The study concludes that sustainable rural empowerment requires coordinated policy execution, capacity building, and participatory governance mechanisms.

Keywords : Agricultural Policy, Rural Development, Farmer Empowerment, Market Reforms, Inclusive Growth

Introduction

Agriculture remains the backbone of rural economies in developing countries. Over the past decades, governments have introduced multiple agricultural reforms aimed at increasing productivity, enhancing market efficiency, and improving farmer welfare. Rural empowerment refers to the process of enhancing the capacity of rural populations to make informed decisions, access resources, and participate actively in socio-economic development. Agricultural reforms are often considered a catalyst for such empowerment.

Objectives of the Study

1. To examine the impact of agricultural reforms on rural income levels.
2. To analyze changes in employment opportunities in rural areas.
3. To compare reform-implemented regions with non-reform regions.
4. To evaluate the role of institutional support in rural empowerment.

Hypotheses

- H1: Agricultural reforms significantly increase farmers' income.
- H2: Agricultural reforms positively influence rural employment generation.
- H3: Regions with structured reforms show higher rural empowerment indicators.

Research Methodology

The study adopts a comparative research design. Both qualitative and quantitative approaches are used. Data were collected from two categories of regions: reform-intensive regions and moderately reformed regions.

Primary Data

Primary data were collected through structured questionnaires and interviews with 100 farmers, self-help group members, and local agricultural officers. Stratified random sampling was adopted.

Secondary Data

Secondary data were collected from government reports, policy documents, agricultural statistics, research journals, and institutional publications.

Data Analysis and Comparative Discussion

The comparative analysis reveals that reform-intensive regions experienced a 20–30% rise in average farm income compared to marginal increases in other regions. Market access improved through digital platforms and cooperative models. Women's participation in agricultural decision-making also increased due to self-help group integration. However, disparities remain due to uneven infrastructure development.

Employment diversification into allied sectors such as dairy, poultry, and food processing contributed to income stability. Access to institutional credit reduced dependence on informal money lenders. Training and capacity-building programs significantly improved awareness about government schemes.

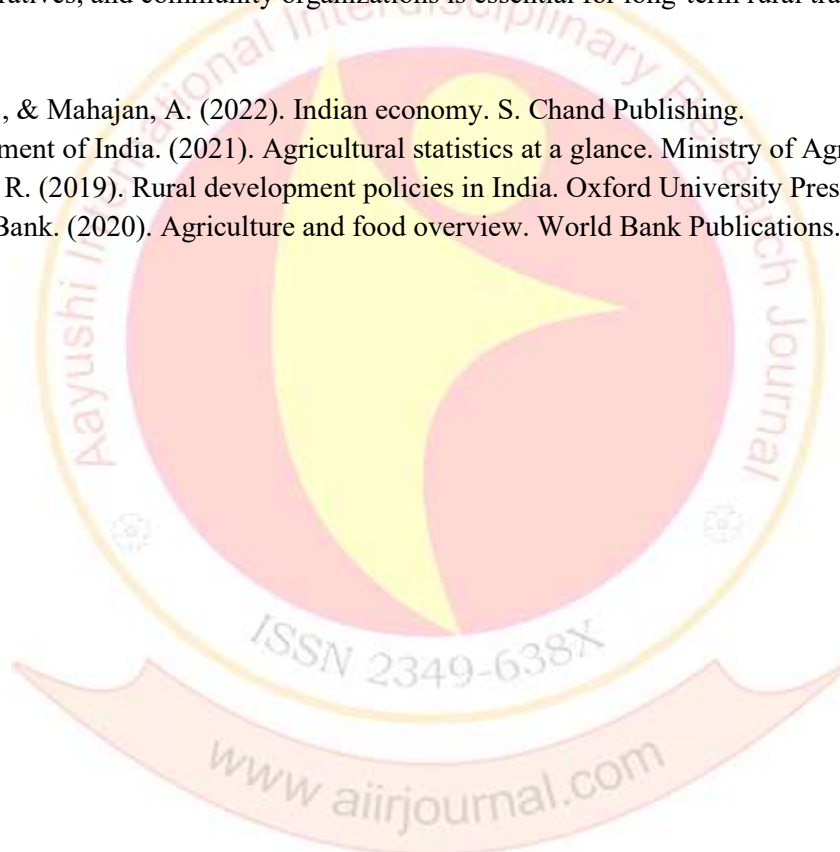
This research is original and has not been published elsewhere. Proper citations are provided for all secondary sources. Data confidentiality of respondents has been maintained. The study adheres to academic integrity, avoids plagiarism, and follows APA referencing style.

Conclusion

Agricultural reforms have a measurable and positive impact on rural empowerment when implemented effectively. The comparative findings indicate that structured policy execution, institutional support, and digital integration significantly enhance rural socio-economic indicators. For sustainable empowerment, reforms must be inclusive, participatory, and climate-sensitive. Policy coordination between government agencies, cooperatives, and community organizations is essential for long-term rural transformation.

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शाश्वत विकास उद्दिष्टे (SDGs) आणि भारताची प्रगती (Achievements of India)

डॉ. विजय शंकर शिंदे

सहयोगी प्राध्यापक,

गोखले एजुकेशन सोसायटीचे,

एच.पी. टी. अँड आर.वाय. के. सायन्स कॉलेज

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प्रस्तावना

सन २०१५ मध्ये संयुक्त राष्ट्र संघटनेच्या (United Nations – UN) १९३ सदस्य देशांनी "२०३० शाश्वत विकास अर्जेन्डा" (2030 Agenda for Sustainable Development) स्वीकारण्यास सहमती दर्शविली.

हा ऐतिहासिक अर्जेन्डा पृथ्वी आणि मानवजातीसाठी सन्मान, शांतता आणि समृद्धी साध्य करण्याच्या उद्देशाने १७ शाश्वत विकास उद्दिष्टे (SDGs) आणि त्यांची लक्ष्ये निश्चित करतो, जी सन २०३० पर्यंत पूर्ण करण्याचे ध्येय आहे.

या अर्जेन्डामध्ये दारिद्र्य निर्मूलन, स्वच्छता, आरोग्य, शिक्षण, आर्थिक विकास यांसारख्या विविध क्षेत्रांमध्ये कृती करण्यावर भर देण्यात आला आहे. तसेच, लोकांच्या सामाजिक गरजा पूर्ण करताना स्थानिक अर्थव्यवस्था मजबूत करण्याचे नियोजनही या अर्जेन्डामध्ये करण्यात आले आहे.

शाश्वत विकास हा आज संपूर्ण जगासाठी एक महत्वाचा विषय बनला आहे. विकास आणि प्रगतीच्या स्पर्धेमुळे देशांमध्ये आर्थिक विकास व वाढ यामध्ये विषमता निर्माण झाली आहे, नैसर्गिक संसाधनांची झपाट्याने घट झाली आहे आणि त्यामुळे पर्यावरणीय संतुलन बिघडले आहे. याचे परिणाम जागतिक तापमानवाढ (Global Warming) आणि तीव्र हवामान बदल (Climate Change) यांच्या स्वरूपात दिसून येत आहेत. हे मानवजातीच्या अस्तित्वालाच धोका निर्माण करत असल्याने, येणाऱ्या पिढ्यांसाठी सुरक्षित आणि उत्तम पर्यावरण सुनिश्चित करणारी रणनीती तयार करणे ही सध्याच्या पिढीची गरज बनली आहे. शाश्वत विकास ही अशी संकल्पना आहे जी विकास आणि प्रगती अशा पद्धतीने घडवून आणण्यावर भर देते की नैसर्गिक संसाधने टिकून राहतील आणि पुढील पिढ्यांपर्यंत योग्य स्थितीत पोहोचतील.

सन २०३० पर्यंत अधिक आशादायी, अधिक समतोल आणि अधिक सुरक्षित जागतिक समुदाय निर्माण करण्याच्या उद्देशाने सत्तरा (१७) शाश्वत विकास उद्दिष्टे (SDGs) निश्चित करण्यात आली आहेत. सप्टेंबर २०१५ मध्ये संयुक्त राष्ट्र महासभेच्या शिखर परिषदेत १९३ सदस्य राष्ट्रांनी ही उद्दिष्टे त्यांच्या शाश्वत विकास अर्जेन्डाचा भाग म्हणून मान्य केली. भारत हा या शिखर परिषदेचा संस्थापक सदस्य आणि स्वाक्षरीकर्ता देश असून २०३० अर्जेन्डाप्रती कटिबद्ध आहे.

या पार्श्वभूमीवर, या संशोधन लेखामध्ये भारतासमोर शाश्वत विकास उद्दिष्टे साध्य करताना आव्हानांवर मात करण्यासाठी आवश्यक त्या ज्या उपाययोजना केल्या आहेत त्याचा अभ्यास करण्याचा प्रयत्न केला आहे.

उद्दिष्टे (Objectives)

- भारताच्या संदर्भात शाश्वत विकास उद्दिष्टांविषयी अधिक चांगली समज निर्माण करणे.
- देशाच्या विकासदर कायम ठेवत शाश्वत विकास उद्दिष्टे साध्य करण्यासाठी भारताने केलेल्या कामगिरीच्या आव्हानांचे विश्लेषण करणे.

संशोधन पद्धती (Methodology)

हा संशोधन लेख स्वरूपाने वर्णनात्मक (Descriptive) आहे. या अभ्यासामध्ये महत्त्वपूर्ण आणि उपयुक्त दुय्यम माहिती (Secondary Data) संकलित करून त्यावर आधारित विश्लेषण करण्यात आले आहे. दुय्यम माहिती संकलनासाठी

प्रकाशित पुस्तके, विविध नियतकालिके आणि वृत्तपत्रांमधील लेख, मासिके, परिषद पेपर्स, कार्यपत्रके (Working Papers), तसेच विविध संकेतस्थळे इत्यादी स्रोतांचा वापर करण्यात आला आहे.

शाश्वत विकासासाठी एकूण १७ उद्दिष्टे (SDGs) आहेत:

- १) उद्दिष्ट १: गरिबी नाही (No Poverty) — सर्व प्रकारची गरिबी सर्वत्र संपवणे.
- २) उद्दिष्ट २: शून्य उपासमार (Zero Hunger) — उपासमार संपवणे, अन्नसुरक्षा व सुधारित पोषण सुनिश्चित करणे आणि शाश्वत शेतीला प्रोत्साहन देणे.
- ३) उद्दिष्ट ३: चांगले आरोग्य व कल्याण (Good Health and Well-being) — सर्व वयोगटांसाठी निरोगी जीवन आणि कल्याण सुनिश्चित करणे.
- ४) उद्दिष्ट ४: गुणवत्तापूर्ण शिक्षण (Quality Education) — सर्वांसाठी समावेशक आणि समान दर्जाचे शिक्षण तसेच आयुष्यभर शिक्षणाच्या संधी उपलब्ध करणे.
- ५) उद्दिष्ट ५: लिंग समानता (Gender Equality) — लिंग समानता साध्य करणे आणि सर्व महिला व मुलींना सशक्त करणे.
- ६) उद्दिष्ट ६: स्वच्छ पाणी व स्वच्छता (Clean Water and Sanitation) — सर्वांसाठी सुरक्षित पाणी व स्वच्छतेची उपलब्धता आणि शाश्वत व्यवस्थापन सुनिश्चित करणे.
- ७) उद्दिष्ट ७: परवडणारी व स्वच्छ ऊर्जा (Affordable and Clean Energy) — सर्वांसाठी परवडणारी, विश्वासार्ह, शाश्वत आणि आधुनिक ऊर्जेची उपलब्धता सुनिश्चित करणे.
- ८) उद्दिष्ट ८: सन्मानजनक काम व आर्थिक वाढ (Decent Work and Economic Growth) — सातत्यपूर्ण, समावेशक व शाश्वत आर्थिक वाढ, पूर्ण आणि उत्पादक रोजगार व सन्मानजनक कामाला प्रोत्साहन देणे.
- ९) उद्दिष्ट ९: उद्योग, नवउपक्रम आणि पायाभूत सुविधा (Industry, Innovation, and Infrastructure) — लवचिक पायाभूत सुविधा उभारणे, समावेशक व शाश्वत औद्योगिकीकरणाला चालना देणे आणि नवउपक्रम प्रोत्साहित करणे.
- १०) उद्दिष्ट १०: असमानता कमी करणे (Reduced Inequality) — देशांतर्गत आणि देशांमधील असमानता कमी करणे.
- ११) उद्दिष्ट ११: शाश्वत शहरे व समुदाय (Sustainable Cities and Communities) — शहरे व वसाहती समावेशक, सुरक्षित, लवचिक आणि शाश्वत बनवणे.
- १२) उद्दिष्ट १२: जबाबदार उपभोग व उत्पादन (Responsible Consumption and Production) — शाश्वत उपभोग आणि उत्पादन पद्धती सुनिश्चित करणे.
- १३) उद्दिष्ट १३: हवामान कृती (Climate Action) — हवामान बदल आणि त्याच्या परिणामांवर तातडीने उपाययोजना करणे.
- १४) उद्दिष्ट १४: जलचर जीवन (Life Below Water) — महासागर, समुद्र आणि सागरी संसाधनांचे संवर्धन व शाश्वत वापर सुनिश्चित करणे.
- १५) उद्दिष्ट १५: स्थलचर जीवन (Life on Land) — स्थलीय परिसंस्था संरक्षण, पुनर्संचयित करणे आणि शाश्वत वापर; जंगलांचे व्यवस्थापन, वाळवंटीकरण रोखणे, जमिनीची हानी थांबवणे आणि जैवविविधतेचे संरक्षण करणे.
- १६) उद्दिष्ट १६: शांतता, न्याय आणि सक्षम संस्था (Peace, Justice, and Strong Institutions) — शाश्वत विकासासाठी शांततापूर्ण व समावेशक समाज घडवणे, सर्वाना न्यायप्रवेश देणे आणि प्रभावी, जबाबदार व समावेशक संस्था उभारणे.

१७) उद्दिष्ट १७: उद्दिष्ट साध्य करण्यासाठी भागीदारी (Partnerships to Achieve the Goals) — शाश्वत विकासासाठी अंमलबजावणीची साधने मजबूत करणे आणि जागतिक भागीदारीला नवसंजीवनी देणे.

भारताची शाश्वत विकास उद्दिष्टांवरील (SDGs) कामगिरी

उद्दिष्ट १: गरिबी नाही (No Poverty)

गरिबी निर्मूलनाच्या दिशेने भारताची प्रगती मोजण्यासाठी २०३० पर्यंतच्या ७ पैकी ३ उद्दिष्टांना समाविष्ट करणारे ५ राष्ट्रीय स्तरावरील निर्देशक निश्चित करण्यात आले आहेत. हे निर्देशक पुढीलप्रमाणे आहेत - गरिबी दर (तेंडुलकर समितीच्या अंदाजानुसार), आरोग्य विमा संरक्षण, मनरेगा अंतर्गत रोजगार मिळालेल्या व्यक्ती, मातृत्व लाभ, बेघरपणा इ. भारत सरकारने दीर्घकालीन गरिबी कमी करण्यासाठी, मूलभूत सेवा वाढवण्यासाठी, सामाजिक सुरक्षा देण्यासाठी आणि रोजगारनिर्मितीसाठी विविध योजना सुरू केल्या आहेत. गरिबी निर्मूलनासाठी प्रमुख योजना पुढील प्रमाणे आहेत- महात्मा गांधी राष्ट्रीय ग्रामीण रोजगार हमी कायदा (MGNREGA), राष्ट्रीय ग्रामीण आजीविका अभियान (NRLM), दीनदयाळ उपाध्याय ग्रामीण कौशल्य योजना (DDU-GKY), राष्ट्रीय सामाजिक सहाय्य कार्यक्रम (NSAP), प्रधानमंत्री जीवन ज्योती विमा योजना (PMJJBY), प्रधानमंत्री जीवन सुरक्षा विमा योजना (PMJSBY), आयुष्मान भारत, मिशन अंत्योदय, राष्ट्रीय अन्न सुरक्षा अभियान, पोषण अभियान, स्वच्छ भारत अभियान, प्रधानमंत्री आवास योजना (PMAY), प्रधानमंत्री उज्ज्वला योजना, प्रधानमंत्री जन धन योजना (PMJDY).

उद्दिष्ट २: शून्य उपासमार (Zero Hunger)

उपासमार संपवण्याच्या अन्न अनुदानाखाली (PDS) समाविष्ट कुटुंबे, ५ वर्षांखालील मुलांमधील खुंटलेली वाढ (Stunting, महिलांमधील रक्ताल्पता (Anaemia), कृषी उत्पादकता त्याचप्रमाणे उपासमार व कुपोषण निर्मूलनासाठी भारताने अनेक महत्त्वपूर्ण योजना राबवल्या आहेत. त्यामध्ये - राष्ट्रीय पोषण अभियान (POSHAN अभियान), अंत्योदय अन्न योजना (AAY), एकात्मिक बाल विकास सेवा योजना (ICDS), मध्यान्ह भोजन योजना (MDM), प्रधानमंत्री मातृ वंदना योजना (PMMVY) इ. याशिवाय कृषी क्षेत्रातील महत्त्वाच्या योजना पुढील प्रमाणे -राष्ट्रीय कृषी विस्तार व तंत्रज्ञान अभियान, राष्ट्रीय शाश्वत कृषी अभियान, राष्ट्रीय अन्न सुरक्षा अभियान या सर्व योजनांद्वारे भारत २०३० पर्यंत उपासमार निर्मूलन आणि अन्नसुरक्षा सुनिश्चित करण्याच्या दिशेने प्रयत्नशील आहे.

उद्दिष्ट ३: चांगले आरोग्य व कल्याण (Good Health and Well-being)

मातृ मृत्यू दर (Maternal Mortality Rate), पाच वर्षांखालील बालमृत्यू दर (Under-five Mortality Rate), बाल लसीकरण कवरेज (Immunization Coverage), क्षयरोग (TB) प्रमाण, आरोग्य क्षेत्रातील मनुष्यबळ (Health Workforce). आरोग्य क्षेत्र बळकट करण्यासाठी भारत सरकारने विविध उपक्रम राबवले आहेत. जसे की- राष्ट्रीय आरोग्य अभियान (NHM), राष्ट्रीय ग्रामीण आरोग्य अभियान (NRHM), राष्ट्रीय शहरी आरोग्य अभियान (NUHM), आयुष्मान भारत - प्रधानमंत्री जन आरोग्य योजना (PMJAY), मिशन इंद्रधनुष्य, सुधारित राष्ट्रीय क्षयरोग नियंत्रण कार्यक्रम (RNTCP), राष्ट्रीय कुष्ठरोग निर्मूलन कार्यक्रम, एकात्मिक रोग देखरेख कार्यक्रम (IDSP), राष्ट्रीय मानसिक आरोग्य कार्यक्रम (NMHP), राष्ट्रीय अंधत्व नियंत्रण कार्यक्रम कर्करोग, मधुमेह, हृदयरोग व स्ट्रोक प्रतिबंध व नियंत्रणासाठी राष्ट्रीय कार्यक्रम (NPCDCS) इ.

उद्दिष्ट ४: गुणवत्तापूर्ण शिक्षण (Quality Education)

गुणवत्तापूर्ण शिक्षणाच्या उद्दिष्टासाठी २०३० पर्यंत पुढील उपाय योजण्यात आले आहेत - प्राथमिक व माध्यमिक स्तरावरील प्रवेश दर (Enrolment Ratio), इयत्ता ५ वीतील विद्यार्थ्यांचे प्राविण्य, इयत्ता ८ वीतील विद्यार्थ्यांचे प्राविण्य, शाळाबाह्य मुले, माध्यमिक स्तरावरील शाळा सोडण्याचा दर (Drop-out Rate), व्यावसायिकदृष्ट्या पात्र शिक्षक, विद्यार्थी-शिक्षक गुणोत्तर (Pupil-Teacher Ratio) शिक्षण क्षेत्रातील आव्हाने लक्षात घेऊन भारत सरकारने विविध नाविन्यपूर्ण योजना राबवल्या आहेत, जसे की - समग्र शिक्षा अभियान, सर्व शिक्षा अभियान (SSA), राष्ट्रीय माध्यमिक शिक्षा अभियान (RMSA), शिक्षक शिक्षण (Teacher Education — TE), तसेच डिजिटल उपक्रम - शाळा कोश (Shala Kosh), शगुन

(Shagun), शाळा सारथी (Shaala Saarthi) या उपक्रमांमुळे शिक्षण क्षेत्रात तंत्रज्ञानाचा वापर वाढवून गुणवत्ता सुधारण्यास मदत होत आहे.

उद्दिष्ट ५: लिंग समानता (Gender Equality)

लिंग समानतेसंदर्भात भारताची कामगिरी मोजण्यासाठी २०३० पर्यंत पुढील उद्दिष्टां निश्चित करण्यात आले आहेत - जन्मावेळी लिंग गुणोत्तर (Sex Ratio at Birth), वेतनातील लिंग अंतर (Wage Gap — पुरुष/स्त्री), घरगुती हिंसा, नेतृत्वातील महिलांचे प्रमाण, महिला कामगार सहभाग दर (Female Labour Force Participation Rate), कुटुंब नियोजन इ. भारत संविधानिक तरतुदी व विविध धोरणांद्वारे सर्व क्षेत्रांत लिंग समानता साध्य करण्यासाठी कटिबद्ध आहे. या उद्दिष्टासाठी राबविण्यात येणाऱ्या काही महत्त्वाच्या योजना पुढील प्रमाणे - जेंडर बजेटिंग, बेटी बचाओ बेटी पढाओ अभियान, सुकन्या समृद्धी योजना, जननी सुरक्षा योजना, वन स्टॉप सेंटर योजना, प्रधानमंत्री उज्ज्वला योजना (PMUY) इ.

उद्दिष्ट ६: स्वच्छ पाणी व स्वच्छता (Clean Water and Sanitation)

या उद्दिष्टासाठी २०३० पर्यंत पुढील उपाय निश्चित करण्यात आले आहेत - ग्रामीण भागातील सुरक्षित व पुरेसे पिण्याचे पाणी, वैयक्तिक शौचालय असलेली ग्रामीण कुटुंबे, खुले शौचमुक्त (ODF) जिल्हे, सांडपाणी प्रक्रिया क्षमता, वार्षिक भूजल उपसा, त्याच बरोबर पुढील महत्त्वाच्या योजना - राष्ट्रीय ग्रामीण पेयजल कार्यक्रम (NRWDP), राष्ट्रीय जल गुणवत्ता उपमिशन, स्वच्छ भारत मिशन — ग्रामीण इ. भारताने २०१९ पर्यंत संपूर्ण देश खुले शौचमुक्त (ODF) करण्याचे उद्दिष्ट ठेवले होते.

उद्दिष्ट ७: परवडणारी व स्वच्छ ऊर्जा (Affordable and Clean Energy)

या उद्दिष्टासाठी विद्युतीकरण झालेली कुटुंबे (%), स्वच्छ इंधन वापरणारी कुटुंबे, नवीकरणीय ऊर्जा (Renewable Energy) परवडणारी आणि स्वच्छ ऊर्जा सर्वांना उपलब्ध करून देण्यासाठी भारताने राष्ट्रीय विद्युत योजना आणि राष्ट्रीय ऊर्जा धोरण तयार केले आहे. त्याचप्रमाणे - राष्ट्रीय सौर मिशन, ग्रीन एनर्जी कॉरिडॉर, ऑफ-ग्रिड आणि विकेंद्रित सौर पीव्ही कार्यक्रम, राष्ट्रीय बायोगॅस व खत व्यवस्थापन कार्यक्रम, प्रधानमंत्री सहज बिजली हर घर योजना (सौभाग्य), LPG अनुदान (PAHAL, दीनदयाळ उपाध्याय ग्राम ज्योती योजना, प्रधानमंत्री उज्ज्वला योजना, उजाला (UJALA), या योजनांद्वारे भारत स्वच्छ, शाश्वत आणि परवडणारी ऊर्जा सर्वांना उपलब्ध करून देण्याच्या दिशेने प्रयत्नशील आहे.

उद्दिष्ट ८ वरील कामगिरी: सन्मानजनक रोजगार आणि आर्थिक वाढ

सन्मानजनक रोजगार आणि आर्थिक वाढ या उद्दिष्टासाठी वार्षिक GDP वाढ दर, बेरोजगारी दर, बँकिंग सुविधांपर्यंत प्रवेश, एटीएम कव्हेरेज हे लक्ष्य साध्य करण्यासाठी सरकारने रोजगार निर्मिती, कौशल्य विकास आणि सर्वसमावेशक आर्थिक वाढ यासाठी अनेक योजना सुरू केल्या आहेत. त्यापैकी काही योजना पुढीलप्रमाणे आहेत - पंतप्रधान रोजगार निर्मिती कार्यक्रम (PMEGP), स्टार्ट-अप इंडिया, स्किल इंडिया, प्रधानमंत्री कौशल ,कास योजना (PMKVY) इ.

उद्दिष्ट ९ वरील कामगिरी: उद्योग, नवोपक्रम आणि पायाभूत सुविधा

उद्योग, नवोपक्रम आणि पायाभूत सुविधा या उद्दिष्टाच्या प्रगतीसाठी पुढीलप्रमाणे अनेक उपक्रम केले आहेत - रस्ते संपर्कता, मोबाईल टेलि-डेन्सिटी, इंटरनेट घनता, 'भारत नेट' अंतर्गत समाविष्ट ग्रामपंचायती पायाभूत सुविधा क्षेत्राला चालना देण्यासाठी भारत सरकारने अनेक उपक्रम राबवले आहेत, जसे की - प्रधानमंत्री ग्राम सडक योजना (PMGSY), भारतमाला प्रकल्प, सागरमाला प्रकल्प. नवोपक्रम आणि उद्योग विकासासाठी पुढील प्रमुख कार्यक्रम राबवले जात आहेत - मेक इन इंडिया, डिजिटल इंडिया इ.

उद्दिष्ट १० वरील कामगिरी: असमानता कमी करणे

असमानता कमी करण्याच्या उद्दिष्टासाठी भारतामध्ये शहरी असमानता, ग्रामीण असमानता, ट्रान्सजेंडर कामगार सहभाग दराचे प्रमाण, अनुसूचित जाती निधी वापर, अनुसूचित जमाती निधी वापर असमानता कमी करण्यासाठी सरकारच्या अनेक योजना थेट किंवा अप्रत्यक्षपणे कार्यरत आहेत. त्यापैकी काही पुढीलप्रमाणे आहेत - प्रधानमंत्री जनधन योजना

(PMJDY), पंतप्रधान रोजगार निर्मिती कार्यक्रम (PMEGP), महात्मा गांधी राष्ट्रीय ग्रामीण रोजगार हमी कायदा (MGNREGA), 2005, दीन दयाल उपाध्याय ग्रामीण कौशल्य योजना (DDUGKY), स्टँड-अप इंडिया योजना इ.

उद्दिष्ट 11 वरील कामगिरी: शाश्वत शहरे आणि समुदाय

शाश्वत शहरे आणि समुदाय या उद्दिष्टाकडे भारताची प्रगती मोजण्यासाठी चार राष्ट्रीय स्तरावरील चार निर्देशांक पुढीलप्रमाणे आहेत - प्रधानमंत्री आवास योजना (PMAY) अंतर्गत पूर्ण झालेली घरे, झोपडपट्ट्यांमध्ये राहणाऱ्या शहरी कुटुंबांचे टक्केवारी, घरपोच कचरा संकलन व्यवस्था, प्रक्रिया केलेल्या कचऱ्याचे टक्केवारी, SDG 11 अंतर्गत नमूद केलेली उद्दिष्टे साध्य करण्यासाठी सरकारने विविध योजना आणि धोरणे राबवली आहेत. त्यामध्ये पुढील योजनांचा समावेश आहे - अटल मिशन फॉर रीजुव्हेनेशन अँड अर्बन ट्रान्सफॉर्मेशन (AMRUT), प्रधानमंत्री आवास योजना - शहरी (PMAY-Urban), स्मार्ट सिटी मिशन इ.

उद्दिष्ट 12 वरील कामगिरी: शाश्वत उपभोग आणि उत्पादन

या उद्दिष्टामध्ये संसाधन कार्यक्षमता वाढविणे, हरित अर्थव्यवस्था आणि शाश्वत पायाभूत सुविधा यांना प्रोत्साहन देणे यावर भर देण्यात आला आहे. तसेच पर्यावरणीय हानी आणि प्रदूषण कमी करणे, तसेच कचरा निर्मिती कमी करणे यावरही लक्ष केंद्रित केले आहे. भारत हा जगातील प्रथम क्रमांकाचा सर्वाधिक लोकसंख्या असलेला देश असून, जगाच्या एकूण लोकसंख्येपैकी सुमारे 17.5 टक्के लोकसंख्या भारतात राहते, परंतु भारताकडे जगाच्या एकूण भूभागापैकी केवळ 2.4 टक्के क्षेत्रफळ आहे. त्यामुळे संसाधन कार्यक्षमता वाढविणे, कचरा आणि प्रदूषण कमी करणे, तसेच अक्षय ऊर्जेवर आधारित तंत्रज्ञानाचा अवलंब करणे यासाठी सर्वसमावेशक धोरणात्मक चौकट आवश्यक आहे.

उद्दिष्ट 13 वरील कामगिरी: हवामान बदल

हवामान बदलासंबंधी नियोजन आणि व्यवस्थापन अधिक प्रभावीपणे करण्यासाठी क्षमता वाढविण्याचे नियोजन आणि प्रोत्साहन देणे हेही यामध्ये अपेक्षित आहे. भारतामध्ये भौगोलिक विविधता मोठ्या प्रमाणात असून विविध प्रकारच्या हवामान प्रणाली, प्रादेशिक आणि स्थानिक हवामान परिस्थिती आढळतात. त्यामुळे देश हवामान बदलाच्या परिणामांना संवेदनशील आहे. यामध्ये पूर, दुष्काळ तसेच किनारी भागांमध्ये सुनामी आणि चक्रीवादळांचा धोका यांचा समावेश होतो.

उद्दिष्ट 14 वरील कामगिरी: जलसंपदा (समुद्र आणि सागरी संसाधने)

या अंतर्गत देशांनी महासागर, समुद्र आणि सागरी संसाधनांचे संवर्धन व शाश्वत वापर करण्याची वचनबद्धता व्यक्त केली आहे. या उद्दिष्टात सागरी प्रदूषण रोखणे, बेकायदेशीर आणि विध्वंसक मासेमारी थांबवणे, तसेच सागरी आणि किनारी परिसंस्थांचे शाश्वत व्यवस्थापन आणि संरक्षण यावर भर देण्यात आला आहे. यासोबतच सागरी आरोग्य सुधारण्यासाठी वैज्ञानिक ज्ञान, संशोधन आणि सागरी तंत्रज्ञान हस्तांतरण वाढविण्यावरही लक्ष केंद्रित केले आहे. भारताने किनारी आणि सागरी परिसंस्थांचे संरक्षण आणि संवर्धन करण्यासाठी विविध उपाययोजना केल्या आहेत.

उद्दिष्ट 15 वरील कामगिरी: स्थलजीवन (Life on Land)

SDG 15 अंतर्गत निश्चित केलेली उद्दिष्टे साध्य करण्यासाठी भारत सरकारने विविध उपक्रम राबवले आहेत. त्यामध्ये पुढील धोरणे व कार्यक्रमांचा समावेश आहे- राष्ट्रीय पर्यावरण धोरण, 2006, राष्ट्रीय कृषी-वनीकरण धोरण, 2014, ग्रीन हायवेज धोरण, 2015, राष्ट्रीय वनीकरण कार्यक्रम, वन्यजीव अधिवास एकात्मिक विकास कार्यक्रम, नैसर्गिक संसाधन आणि परिसंस्था संवर्धन कार्यक्रम.

उद्दिष्ट 16 वरील कामगिरी: शांतता, न्याय आणि मजबूत संस्था

शांतता, न्याय आणि सक्षम संस्था हे साध्य करण्यासाठी भारताने विविध उपक्रम राबवले आहेत. भारत हक्कांवर आधारित कायदेव्यवस्थेद्वारे आपल्या नागरिकांना सक्षम बनवतो. माहितीचा अधिकार कायदा, 2005 (Right to Information Act, 2005) नागरिकांना सार्वजनिक प्राधिकरणांकडून माहिती मिळवण्याचा अधिकार देतो, ज्यामुळे संस्थांची पारदर्शकता आणि उत्तरदायित्व सुनिश्चित होते. आधार योजना ही जगातील सर्वात मोठ्या अद्वितीय राष्ट्रीय ओळख प्रकल्पांपैकी एक आहे. या उपक्रमांमुळे सेवा वितरण अधिक कार्यक्षम झाले असून भ्रष्टाचारात घट झाली आहे.

उद्दिष्ट 17 वरील कामगिरी: शाश्वत विकासासाठी भागीदारी

या उद्दिष्टामध्ये SDGs ची यशस्वी अंमलबजावणी आणि पूर्तता करण्यासाठी आवश्यक घटकांवर भर देण्यात आला आहे. त्यामध्ये पुढील बाबींचा समावेश होतो. विकासासाठी वित्तपुरवठा (Financing for Development), तंत्रज्ञानापर्यंत प्रवेश, क्षमता विकास उपाययोजना - जागतिक विकासासाठी व्यापाराला प्रोत्साहन, संस्थात्मक समन्वय आणि धोरणात्मक सुसंगती, बहु-हितधारकांचा सहभाग आणि भागीदारी निर्माण करणे, नियमित निरीक्षणाद्वारे उत्तरदायित्व सुनिश्चित करणे

निष्कर्ष

शाश्वत विकासाची संकल्पना ही जगाच्या भविष्यासाठी अत्यंत महत्त्वाची ठरली आहे. शाश्वत विकास साध्य करण्यासाठी अनेक आव्हाने आहेत. भारतासमोर वाढती लोकसंख्या आणि वेगाने बदलणारी शहरी जीवनशैली ही मोठी आव्हाने आहेत, ज्यामुळे पर्यावरणीय आणि सामाजिक समस्या निर्माण होत आहेत.

वाढत्या पर्यावरणीय समस्या आणि भविष्यातील पिढ्यांच्या कल्याणावर वाढता धोका लक्षात घेता, उच्च शिक्षण हे शाश्वत विकासाला प्रोत्साहन देण्यासाठी प्रभावी साधन ठरू शकते. उच्च शिक्षणामुळे सामाजिक समस्यांकडे लक्ष वेधले जाईल आणि आंतरशाखीय संशोधनाच्या माध्यमातून त्यावर उपाय शोधता येतील.

शाश्वत भविष्यासाठी परिवर्तन घडवून आणणारा सक्षम अभ्यासक्रम विकसित करण्याची आवश्यकता आहे. भारतीय विद्यापीठे उच्च शिक्षणात मूलभूत बदल घडवून आणण्यासाठी विविध उपाययोजना करू शकतात. शाश्वत विकास वास्तवात आणण्यासाठी उच्च शिक्षण क्षेत्रात ठोस प्रयत्नांची गरज आहे.

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भारतातील शाश्वत विकासाची उद्दिष्टे

डॉ. मंगल नागोराव मारकड

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सहाय्यक प्राध्यापक अर्थशास्त्र विभाग

श्रीमंत बाबासाहेब देशमुख महाविद्यालय आटपाडी, जिल्हा सांगली

प्रस्तावना :-

भावी पिढीच्या गरजा पूर्ण करण्याच्या क्षमतेला बाधा पोहोचू न देता वर्तमान काळातील गरजा पूर्ण करण्याच्या विकासाला शाश्वत विकास असे म्हणतात. शाश्वत विकासात पृथ्वीवरील संसाधनाचा वापर विकासासाठी करत असताना पुढील पिढ्यांनाही संसाधनाचा वापर काळजीपूर्वक करणे अपेक्षित असते. नैसर्गिक संसाधन हे निसर्गनिर्मित असून ती मर्यादित असतात या नैसर्गिक संसाधनावर कोणत्याही एका विशिष्ट समाजाचे स्वामित्व नसून संपूर्ण सजीव सृष्टीच्या असते. तसेच ही संसाधने एका पिढी पुरते नसून भविष्यातील अनेक पिढ्यांसाठी असते. या संसाधनाचा वापर जर अमर्याद केला तर भावी पिढ्यासाठी संसाधने शिल्लक राहणार नाही. नैसर्गिक संसाधनाचा काटकसरीने वापर आणि त्यातून भौतिक विकास सामाजिक न्याय आणि समता यावर शाश्वत विकासामध्ये भर दिले आहे. शाश्वतता म्हणजे चिरकाल टिकणे न्हास न होणे. सन 1987 मध्ये ब्रुटलँड अहवालात विकासाचे आधुनिक संकल्पना मांडण्यात आली. शाश्वत विकासात दीर्घकालीन टिकून राहणारा विकास अभिप्रेत असतो. साधन संपत्ती मर्यादित असल्याने ती संपण्याचा धोका असतो. शिवाय साधन सामग्रीच्या अतिवापरामुळे पर्यावरणाची हानी होऊ शकते. म्हणून वर्तमानकालीन विकासाबरोबर भविष्यातील विकास सुद्धा टिकून राहणारा असेल तर शाश्वत विकास होईल.

संशोधनाचे उद्देश :-

- 1) भारतातील शाश्वत विकासाच्या प्रगतीचा आढावा घेणे.
- 2) शाश्वत विकासाच्या उद्दिष्टांचा आढावा घेणे.
- 3) शाश्वत विकासाचे उद्दिष्टे साध्य करीत असताना येणाऱ्या समस्यांचा अभ्यास करणे अभ्यास करणे.
- 4) भारताचा जागतिक पातळीवरील शाश्वत विकास इंडेक्स मध्ये क्रमांकाचा अभ्यास करणे.

गृहिते :-

- 1) शाश्वत विकासासाठी भारत प्रयत्न करत आहे.
- 2) शाश्वत विकासाची उद्दिष्टे साध्य करण्यात भारताची प्रगती समाधानकारक आहे.

संशोधन पद्धती :-

प्रस्तुत शोधनिबंध हा पूर्णतः दुय्यम साधनसामग्रीवर आधारलेला आहे. त्यामध्ये मासिके, वर्तमानपत्रे, संदर्भ ग्रंथ, आणि इंटरनेटवरील माहितीचा समावेश करण्यात आलेला आहे. सदर माहितीच्या आधारे प्रस्तुत शोध निबंधामध्ये वर्णनात्मक विश्लेषण करण्यात आले आहे.

शाश्वत विकास व्याख्या :-

विविध अर्थशास्त्रज्ञांनी शाश्वत विकासाची व्याख्या केलेली आहे .

१) ब्रुटलँड अहवाल :- “शाश्वत विकास म्हणजे असा विकास की जो भविष्यकालीन पिढीच्या त्यांच्या स्वतःच्या गरजा पूर्ण करण्याच्या सामर्थ्याचे तडजोडी शिवाय सध्याच्या गरजांची पूर्तता करणे होय.”

२) **रॉबर्ट ॲलन** :- “शाश्वत विकास असा विकास असतो की मानवी गरजांचे चिरकाल टिकणारे साधन आणि मानवी जीवनाच्या दर्जा सुधारणा साध्य करणे असतो”.

३) “शाश्वत विकास म्हणजे आपल्या वर्तमानातील गरजा पूर्ण करताना पुढील पिढ्यांच्या त्यांच्या गरजा पूर्ण करण्याच्या क्षमतेला बाधा न येऊ देता साध्य केलेला विकास होय”

थोडक्यात शाश्वत विकास म्हणजे पृथ्वीवरील संसाधनाचा उपयोग करताना पुढील पिढ्यांच्या विकासासाठी संसाधनांचा काळजीपूर्वक वापर करणे होय यामध्ये मानवनिर्मित आणि नैसर्गिक संसाधनांचा मानवाने काळजीपूर्वक आणि आवश्यक त्या प्रमाणातच वापर करणे अपेक्षित आहे.

शाश्वत विकासाची संकल्पना :-

आज जागतिकीकरण आणि औद्योगिकरणामुळे नैसर्गिक संसाधनाचा वापर मोठ्या प्रमाणात केला जात आहे. हा वापर करताना आपल्या भविष्यकालीन पिढ्यांचा आवश्यक त्या प्रमाणात विचार केला जात नाही. या नैसर्गिक साधनांच्या अतिरिक्त वापरामुळे भविष्यकालीन पिढ्यांच्या विकासाला मोठा धोका निर्माण झाला आहे. या नैसर्गिक संसाधनांचा नियंत्रित वापर करणे अपेक्षित आहे. शाश्वत विकासासाठी सौर ऊर्जा, पवन ऊर्जा, समुद्राच्या लाटेपासून वीज निर्मिती करणे यासारख्या नवीनकरण क्षम ऊर्जा स्रोतांचा जास्तीत जास्त वापर करणे अपेक्षित आहे. प्रदूषण औद्योगिकरण, लोकसंख्या वाढ, अतिरिक्त जल उपसा, अनिर्बंध जंगलतोड, शहरीकरण, अतिरिक्त इंधन वापर या सर्व चुकीच्या पद्धतीने शाश्वत विकासाला बाधा निर्माण होत आहे. पृथ्वीवरील मनुष्य प्राण्याव्यतिरिक्त इतर कोणताही प्राणी आपल्या गरजेपेक्षा जास्त संसाधनाचा वापर करीत नाही.

शाश्वत विकासाची उद्दिष्टे :-

२०१५ मध्ये संयुक्त राष्ट्रांच्या महासभेच्या शिखर परिषदेत १९३ सदस्य राष्ट्रांनी १६९ लक्षसह १७ शाश्वत विकास उद्दिष्टे स्वीकारली. संयुक्त राष्ट्रसंघाच्या सदस्य राष्ट्रांनी २०३० पर्यंत ही उद्दिष्टे साध्य करावीत असे अपेक्षित आहे. जर सर्व जगाचा विकास झाला तरच विकासाची फळे सर्वांना समान मिळतील नाहीतर नैसर्गिक आणि पर्यावरणीय संकटामुळे मानवाचा निभाव लागणार नाही म्हणून शाश्वत विकास या संकल्पनेला विशेष महत्त्व प्राप्त झाले आहे.

१) दारिद्र्य निर्मूलन :- सर्व प्रकारची गरिबी संपविणे.

२) उपासमार निर्मूलन :- उपासमार मिटविणे यासाठी अन्नसुरक्षा आणि सुरक्षित पोषण आहार मिळून देणे, शाश्वत शेतीचा प्रसार करणे.

३) सुदृढ आरोग्य व कल्याण :- सर्व वयोगटातील लोकांना निरोगी आयुष्य व लोककल्याण सुनिश्चित करणे.

४) गुणवत्ता पूर्ण शिक्षण :- सर्वांना सर्वसमावेशक व गुणवत्तापूर्ण शिक्षण उपलब्ध करून देणे.

५) लैंगिक समानता :- स्त्री व पुरुष यामध्ये समानता निर्माण करणे प्राप्त करून देणे आणि महिलांना सक्षम करणे.

६) शुद्ध पाणी व स्वच्छता च्या सुविधा :- स्वच्छ पाणी व स्वच्छतेचे सुविधांची उपलब्धता करून देणे. देशातील लोकांना शुद्ध व सुरक्षित पाणी सहजतेने उपलब्ध झाले पाहिजे.

७) पुनर्निर्मितीक्षम ऊर्जा :- सर्वांना कमी खर्चात विश्वसनीय शाश्वत आणि आधुनिक ऊर्जा साधने उपलब्ध करून देणे.

८) चांगला रोजगार व आर्थिक वाढ :- शाश्वत सर्व समावेशक आर्थिक वाढ आणि सर्वांसाठी रोजगाराच्या संधी निर्माण करून देणे.

९) नाविन्यता आणि पायाभूत सुविधा :- मूलभूत सोयी सुविधांची निर्मिती करणे व टिकाऊ औद्योगिक विकास साध्य करणे.

१०) आर्थिक विषमता कमी करणे :- देशांतर्गत आर्थिक विषमता कमी करणे.

११) शाश्वत शहरे आणि समाज :- सुरक्षित व पर्यावरण पूरक शहरांची निर्मिती करणे.

१२) साधनांचा जबाबदार वापर :- नूतनीकरणीय साधनाचा वापर कार्यक्षमपणे वाढला पाहिजे आणि अनुतनीकरणीय साधनाचा वापर कार्यक्षमपणे व काळजीपूर्वक केला पाहिजे.

- १३) हवामान कृती :- हवामानातील होणाऱ्या बदलांचा सामना करणे, हवामानातील बदल व त्याचे दुष्परिणाम रोखण्यासाठी त्वरित उपाययोजना करणे.
- १४) जलजीवन :- महासागर आणि सागरी संसाधनाचे संवर्धन करणे.
- १५) भू जीवन :- परिसंस्था आणि जंगलांचे रक्षण करणे पर्यावरणीय व्यवसायाचा शाश्वत पद्धतीने वापर करणे. वनांचे व्यवस्थापन, जमिनीची पोत कमी होण्याची प्रक्रिया आणि वाळवंटीकरण अशा जैवविविधतेची हानी रोखणे.
- १६) शांतता आणि न्याय :- शांततापूर्ण समाजाची निर्मिती करणे.
- १७) ध्येयासाठी भागीदारी :- शाश्वत विकासासाठी वैश्विक भागीदारी निर्माण व्हावी.

SDG इंडिया इंडेक्स म्हणजे काय :-

SDG इंडिया इंडेक्स शाश्वत विकासाची उद्दिष्टे (SDG) साध्य करण्यासाठी वापरला जातो. भारताच्या राज्यस्तरीय प्रगतीचा मागवा घेण्यासाठी राष्ट्र SDG इंडिया इंडेक्स चा वापर करते. यामध्ये राज्य किंवा केंद्रशासित प्रदेशांना ० ते १०० असे गुण दिले जातात. २०२६ पर्यंत भारताने गरिबी निर्मूलन चांगले आरोग्य स्वच्छ पाणी परवडणारी ऊर्जा शाश्वत शहरी यामध्ये लक्षणीय प्रगती दर्शविली आहे. २०१८ मध्ये भारताचा SDG गुणांक ५७ होता. त्यामध्ये वाढ होऊन २०१९-२० मध्ये तो गुणांक ६० झाला व २०२०-२१ मध्ये तो ६६ वर आला. २०२३-२४ च्या अहवालानुसार केरळ आणि उत्तराखंड हे सर्वोत्तम कामगिरी करणारे राज्य होते तर बिहार आणि झारखंड मागे राहिले आहेत. SDG निर्देशांक स्कोर २०२२-२३ मध्ये ६६ होता. यामध्ये सुधारणा होऊन २०२३-२४ मध्ये सुधारणा होऊन ७१ पर्यंत वाढ झालेली आहे. २०२५ च्या SDG चा निर्देशांकात भारताचा क्रमांक १६७ देशांपैकी ९९ वा आहे भारताचा गुणांक ६७ आहे.

जागतिक पातळीवर SDG च्या निर्देशांकात विविध वर्षातील भारताचा क्रमांक

वर्ष	SDG निर्देशांकात भारताचा क्रमांक
२०१७	११६
२०१८	११२
२०१९	११५
२०२०	११७
२०२१	१२०
२०२२	१२१
२०२३	११२
२०२४	१०९
२०२५	९९

स्रोत : The Economic Times

वरील तक्त्यावरून २०१७ पासून विविध वर्षातील जागतिक स्तरावरील भारताचा क्रमांक किती होता हे दर्शविण्यात येते. जागतिक पातळीवर जो पूर्वी SDG च्या निर्देशांकात २०१७ यावर्षी ११६ व्या क्रमांकावर होता. २०१८ या साली भारताचा जागतिक पातळीवर क्रमांक ११२ व्या स्थानावर आला. २०१९ मध्ये भारत ११५ व्या स्थानावर गेला. २०२३ मध्ये भारताने ११२ स्थान पुन्हा मिळविले आणि २०२४ साली जागतिक पातळीवर १०९ व्या स्थानावर आला. तो २०२५ यावर्षी ९९ क्रमांकात आलेला आहे. संयुक्त राष्ट्रांच्या शाश्वत विकास अहवालात भारताने प्रथम टॉप १०० मध्ये स्थान मिळविले आहे. यावर्षी वीज उपलब्धता डिजिटल पायाभूत सुविधा आणि मूलभूत सेवांमध्ये मागील वर्षाची तुलनेत सुधारणा झालेली आहे.

भारतात शाश्वत विकाससाध्य करण्याचा मार्ग :-

भारतात सरकार शाश्वत विकासाचे उद्दिष्टे साध्य करण्यासाठी विविध योजना तयार करते.

१) अक्षय ऊर्जा :-

दीर्घकाळापर्यंत ऊर्जेचा वापर सर्वांना करता यावा यासाठी लोकांनी सौर ऊर्जा आणि पवन ऊर्जेमध्ये जास्तीत जास्त गुंतवणूक करावी. यासाठी शहरी आणि ग्रामीण भागामध्ये सौर पॅनलचा अधिक वापर आवश्यक आहे. ऊर्जेची बचत करणारे उपकरणे वापरावी.

२) शाश्वत शेती :-

आरोग्यासाठी घातक असणाऱ्या रासायनिक खते आणि कीटकनाशकाचा वापर कमी करण्यासाठी शेतकऱ्यांमध्ये सेंद्रिय शेतीला अधिक प्रोत्साहन देणे गरजेचे आहे. भविष्यामध्ये पाण्याची टंचाई निर्माण होऊ नाही यासाठी ठिबक सिंचन आणि पावसाच्या पाण्याचा संचय करणे यावर अधिक लक्ष केंद्रित करणे गरजेचे.

३) जलसंधारण :-

शेतकऱ्यांबरोबर शहरी आणि ग्रामीण भागात राहणाऱ्या सर्व जनतेने भूजल पातळी वाढावी यासाठी आणि भावी पिढ्यांना स्वच्छ शुद्ध पाणी पुरवण्यासाठी जलसंधारणाच्या दिशेने कामकाज केले पाहिजे. पाण्याचा जपून व काळजीपूर्वक वापर करणे गरजेचे आहे

४) कचरा व्यवस्थापन :-

प्रत्येकाने कचरा कमी निर्माण होईल याची काळजी घेणे गरजेचे आहे. कचऱ्यातून टाकाऊ पासून टिकाऊ वस्तु निर्माण करणे गरजेचे आहे याद्वारे कचऱ्याचा पुनर्वापर होईल. वस्तू खरेदी करत असताना पर्यावरण पूरक अशाच वस्तूची निवड करणे गरजेची आहे. कचरा निर्मिती कमी करण्यासाठी कचऱ्याचे वापरणे योग्य उर्जेत रूपांतर करण्यासाठी कचरा व्यवस्थापन तंत्रज्ञानाबद्दल अधिक माहिती लोकांना असणे आवश्यक आहे.

भारतामध्ये शाश्वत विकास साध्य करण्यात येणाऱ्या समस्या :-

संयुक्त राष्ट्र संघाने मांडलेल्या शाश्वत विकासाच्या उद्दिष्टानुसार भारत शाश्वत विकासाच्या दिशेने प्रयत्न करत आहे. पण या उद्दिष्टाची पूर्तता करत असताना भारताला अनेक समस्यांचा सामना करावा लागत आहे त्या पुढील प्रमाणे.

१) वाढती लोकसंख्या :- भारताची लोकसंख्या खूप वेगाने वाढत आहे. भारत लोकसंख्येच्या बाबतीत एक नंबरचा देश आहे. भारतातील वाढती लोकसंख्या ही शाश्वत विकासातील मोठी अडचण आहे. वेगाने लोकसंख्या वाढल्यामुळे अन्न, वस्त्र, निवारा, शिक्षण आणि रोजगाराच्या संधी यावर मोठ्या प्रमाणावर ताण पडतो आणि वाढत्या लोकसंख्येमुळे नैसर्गिक संसाधनाचा अतिवापर होऊन पर्यावरणाचा न्हास होतो.

२) दारिद्र्य आणि आर्थिक विषमता :- भारतात मोठा वर्ग दारिद्रेषेखाली जीवन जगत आहे. जागतिक बँकेच्या २०२२-२३ अहवालानुसार भारतातील दारिद्र्याच्या प्रमाण २.३% आले असले तरीही प्रत्यक्षात मात्र मोठ्या प्रमाणात ग्रामीण भागात लोक गरिबीमध्ये जीवन जगत आहे आणि देशाचा आर्थिक विकास होत असताना आर्थिक विषमते मध्येसुद्धा वाढ होताना दिसून येते.

३) बेरोजगारी :- भारतात वाढत्या लोकसंख्येमुळे बेरोजगारीचे प्रमाण मोठ्या प्रमाणात वाढत आहे. विशेष करून तरुणांमध्ये बेरोजगारीचे प्रमाण मोठ्या प्रमाणात वाढत आहे आणि जे लोक असंघटित शेतात काम करतात अशा लोकांना सामाजिक सुरक्षा मिळत नाही.

४) पर्यावरणाचा न्हास :- वृक्षतोड औद्योगीकरण, वाढते जल प्रदूषण, भूमी प्रदूषण आणि वायू प्रदूषण यामुळे जैवविविधतेचा नाश होऊन पर्यावरणाचा समतोल बिघडतो आणि याचा परिणाम मानवी आरोग्यावर होतो.

५) पाणीटंचाई आणि जल व्यवस्थापन :- भारताचे अनेक भागांमध्ये पाण्याची कमतरता आहे. विहिरी आणि कुपनलिकेद्वारे भूजलाचा अतिवापर होत आहे. पावसाच्या पाण्याच्या अपुरे व्यवस्थापनामुळे पाणी आडवा पाणी जिरवा अशा योजना राबविल्या जात नाही आणि त्यामुळे पाण्याची उपलब्धता कमी होत आहे.

- ६) **शहरीकरणाच्या समस्या** :- शहरीकरणामुळे अनेक समस्या निर्माण झाले आहे झोपडपट्ट्याची मोठ्या प्रमाणात वाढ झाली. घनकचरा व्यवस्थापन आभाव व मोठ्या प्रमाणातील वाहन आणि औद्योगीकरणामुळे शाश्वत शहरे घडविणे कठीण बनले आहे.
- ७) **शिक्षण आरोग्याच्या सुविधांची कमतरता** :- ग्रामीण आणि दुर्गम भागामध्ये दर्जेदार शिक्षण आणि आरोग्याच्या सुविधा उपलब्ध नाहीत.
- ८) **हवामान बदलाचे परिणाम** :- पूर दुष्काळ उष्णतेच्या लाटा याचा परिणाम शेतीवर होतो. त्यामुळे शेतीची उत्पादकता कमी होते. त्याचप्रमाणे याचा परिणाम माननीय आरोग्यावर पण होतो.
- ९) **जनजागृतीचा अभाव** :- शाश्वत विकासाच्या बाबतीत लोकांमध्ये पुरेशी जागरूकता नाही. त्यामुळे आवश्यक त्या प्रमाणात शाश्वत विकासासाठी लोकसहभाग प्राप्त होत नाही. शाश्वत विकास साध्य करताना अनेक समस्या निर्माण होतात. शाश्वत विकासासाठी कितीही ध्येय धोरणे चांगली असली तरीही त्या धोरणाचे प्रभावीपणे अंमलबजावणी होत नाही.

गोष्टवारा :-

थोडक्यात शाश्वत विकास म्हणजे आपल्या वर्तमानातील गरजा पूर्ण करताना पुढील पिढ्यांच्या त्यांच्या गरजा पूर्ण करण्याच्या क्षमतेला बाधा न येऊ देता साध्य केलेला विकास होय. पृथ्वीवरील संसाधनांचा उपयोग करताना पुढील पिढ्यांच्या विकासासाठी संसाधनांचा काळजीपूर्वक वापर करणे होय. कारण नैसर्गिक संसाधन आणि निसर्गनिर्मित असून ती मर्यादित असतात या नैसर्गिक संसाधनावर कोणत्याही एका विशिष्ट समाजाचे स्वामित्व नसून संपूर्ण सजीव सृष्टीच्या असते. २०२५ यावर्षी राष्ट्राच्या शाश्वत विकास अहवालात भारताने प्रथम टॉप १०० मध्ये स्थान मिळविले आहे. SDG चा निर्देशांकात भारताचा क्रमांक १६७ देशांपैकी ९९ वा आहे भारताचा गुणांक ६७ आहे. भारताने जागतिक पातळीवर शाश्वत विकासासाठी चांगली कामगिरी केलेली दिसून येते. तरी सुद्धा भारताला शून्य उपासमार साध्य करणे दर्जेदार शिक्षण सुधारणे असमानता कमी करणे हवामान कृती वाढविणे या प्रमुख क्षेत्रावर अधिक लक्ष केंद्रित करण्याची आवश्यकता आहे. आत्तापर्यंत भारताने शाश्वत विकासाच्या बाबतीत चांगली प्रगती केलेली दिसून येते. २०२३-२४ च्या अहवालानुसार केरळ आणि उत्तराखंड हे सर्वोत्तम कामगिरी करणारे राज्य होते. शाश्वत विकासाची उद्दिष्टे ही खूप चांगली आहेत पण उद्दिष्टाचे प्रभावीपणे अंमलबजावणी करणे ही तितकेच महत्त्वाचे आहे. शाश्वत विकासाच्या बाबतीत लोकांमध्ये जागरूकता निर्माण करून त्यांचा सहभाग वाढविला तर शाश्वत विकास आणखी चांगल्या प्रकारे भारताला साध्य करता येईल.

संदर्भ ग्रंथ :-

- १) शाश्वतता आणि विकास — प्रा. संभाजी पाटील, व्ही जे पाटील, प्रशांत पब्लिकेशन.
- २) पर्यावरण परिस्थितीकी - डॉक्टर तुषार घोरपडे.
- ३) पर्यावरण और विकास - सुंदरलाल बहुगुणा.
- ४) पर्यावरण आणि विकास भावी पिढ्यांसाठी मानवी अस्तित्वासाठी - नवनाथ मोरे, - Gathe Congnition.
- ५) समता मुलक शाश्वत विकासाची दिशा दृष्टी - प्रा. एच. एम. देसरडा- Gathe Congnition.
- ६) शाश्वत विकास ध्येय : ओळख - डॉ. प्रतिभा शांताराम कदम, Nitya.
- ७) शाश्वत विकास आणि भारत - डॉ. एस व्ही ढमढेरे.

संसाधन व्यवस्थापनातून शाश्वत विकासाची दिशा

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प्रस्तावना :

शाश्वत विकास हा सध्याचा महत्त्वाचा विषय आहे. या विषयाची जागतिक स्तरावर दखल घेतली आहे. शाश्वत विकासावर जर वेळीच उपायोजना केली नाही. तर पुढच्या पिढ्यांना त्याचे गंभीर परिणाम सहन करावे लागतील. शाश्वत विकासात आर्थिक विकास आणि पर्यावरणीय यांचा योग्य मेळ घालणे आवश्यक आहे. शाश्वत विकासाबाबत आपल्याला योग्य सखोल माहिती असणे आवश्यक आहे, यासाठी शाश्वत विकास संकल्पना साध्या पद्धतीने मांडण्याचा प्रयत्न केला आहे, कारण शाश्वत विकास प्रत्येक व्यक्ती अथवा देशासाठी अतिशय महत्त्वाचा विषय आहे. शाश्वत विकास हा समाज पर्यावरण व अर्थव्यवस्था यांच्या योग्य समन्वयातून साध्य होऊ शकेल सध्या वाढते प्रदूषण, जागतिक हवामान बदल, लोकसंख्या वाढ व पर्यावरणाच्या न्हासामुळे शाश्वत विकासाला महत्त्व प्राप्त झालेले आहे. नैसर्गिक संसाधने मर्यादित असतात मात्र त्याचा वापर अमर्याद पद्धतीने होताना दिसून येतो. भविष्यात ती संपण्याचा धोका निर्माण होत आहे अधिक उत्पादन घेण्याच्या नादात आपण पर्यावरण दूषित करत आहोत त्या दृष्टीने शाश्वत विकास महत्त्वाचा ठरतो.

Sustainable development म्हणजे त्याला शाश्वत विकास अथवा टिकाऊ विकास अथवा स्वयंप्रेरित विकास अथवा चौरकालीन विकास असेही म्हटले जाते. ही बहुआयामी संकल्पना आहे शाश्वत विकास अथवा स्वयं प्रेरित विकास ही संकल्पना 1992 मध्ये रिओ-दि-जेनरो ब्राझील येथे झालेल्या जागतिक पर्यावरण परिषदेने जगासमोर मांडली आहे. शाश्वत विकास या शब्दाचा उपयोग 1980 मधील जागतिक संवर्धन डावपेच यामध्ये करण्यात आला परंतु या संकल्पनेचा उगम सतराव्या व अठराव्या शतकात झाल्याचे दिसून येते. स्कॉटहोम येथे 1972 मध्ये संयुक्त राष्ट्राने UN conference on human environment UNICE ही परिषद भरवली. त्यामध्ये पर्यावरण हा एक विकासाचा निर्णय मुद्दा असल्याचे मांडण्यात आले. या परिषदेच्या परिणामावरून United Nations Environment program UNEP ची स्थापना झाली. इको डेव्हलपमेंट ही संज्ञा UNEP चे पहिले संचालक मॉरिस स्टॉंग यांनी वापरली. 1980 मध्ये इंटरनॅशनल युनियन फॉर कंजर्वेशन ऑफ नेचर आययुसीएन चे दोन शास्त्रज्ञ युवा बेलफोर आणि वेक जॉक्सन यांनी जागतिक संवर्धन रणनीती अथवा डावपेच हा अहवाल प्रसिद्ध केला. त्यामध्ये सर्वप्रथम शाश्वत विकास sustainable development हा शब्दप्रयोग केला. 1987 मध्ये संयुक्त राष्ट्रांच्या पर्यावरण आणि विकास विषयक जागतिक आयोगाने आपला अहवाल प्रकाशित केला. त्याला सर्वसामान्यपणे ब्रुटलँड रिपोर्ट म्हणतात म्हणजेच ब्रुटलँड आयोग 1987 आणि 1992 मधील वसुंधरा परिषद यांनी शाश्वत विकासाच्या संकल्पनेचा विकास केला त्यामुळे एक स्वयंपूर्ण अशी विकासाची संकल्पना उदयास आली.

संकल्पना:

- शाश्वत विकास : वर्तमान आणि भविष्यातील पिढ्यांच्या विकासात्मक आणि पर्यावरणीय गरजा समन्यायी पद्धतीने भागविल्या जातात .
- संसाधन व्यवस्थापन : संसाधन व्यवस्थापन म्हणजे नैसर्गिक संसाधनाचा असा वापर की, ज्याच्या परिणामस्वरूप संसाधनांच्या नैसर्गिक साठ्यांसाठी संकट निर्माण होणार नाही व ही संसाधने वर्तमानासोबत भविष्यातही कोणतीही अवनती न होता टिकून राहतील.

- मानवतावादी विचारधारा: ही एक आशी विचारधारा आहे ज्यामध्ये मनुष्याची ओळख तो कोणत्या देशाचा नागरिक आहे किंवा कोणत्या सामाजिक वर्गातील सदस्य आहे ह्यावरून ठरत नाही तर तो ह्या पृथ्वीचे एक अपत्य आहे ह्यावरून ठरते.

3. शाश्वत विकासाची उद्दिष्टे:

- 1 तंत्रज्ञानाचा वापर करून शाश्वत विकास घडवून आणणे.
2. संसाधनाचे रक्षण आणि संवर्धन केल्याने शाश्वत विकास घडून येईल.

4. गृहीतके:

1. संसाधनांची काटकसर करतांना वर्तमान पिढीच्या गरजा भागविणे महत्वाचे आहे .
2. तंत्रज्ञानाच्या वापरामुळे पर्यावरण आणि जैवविविधतेला धोका निर्माण होणार नाही.
3. संसाधनांचे रक्षण केवळ मानवतावादी विचारधारा डोळ्यासमोर ठेवूनच पूर्ण होईल.
4. जगातील सर्व देश कोणत्याही परस्पर स्वार्थाशिवाय कार्य करतील .
5. बाजार अर्थव्यवस्थेमुळे पर्यावरणावर नकारात्मक प्रभाव पडणार नाही.
6. सर्वात महत्वाचे : शाश्वत विकास घडवून आणण्यासाठी जगातील सर्व समुदाय, सर्व लोक , सर्व क्षेत्रे केवळ ह्या वसुंधरेची अपत्य म्हणून कार्य करतील.

5. माहिती संकलन पद्धती:

ह्या संशोधन पेपर साठी प्रामुख्याने द्वितीय तथ्य संकलन पद्धती चा वापर केला आहे. ह्या संशोधनासाठी राष्ट्रीय तसेच आंतरराष्ट्रीय व्याख्यानांमधून तथ्य संकलित केली आहेत.

विश्लेषण :

6.1) तंत्रज्ञानाचा वापर करून शाश्वत विकास घडवून आणणे:

नवीकरणीय ऊर्जेतील तंत्रज्ञान:

सौर ऊर्जा की सूर्याच्या ऊर्जेपासून सौर पॅनल द्वारे निर्माण होते जी फायदेशीर आहे. कारण ती पूर्णपणे विनामूल्य आहे. त्याचा पुरवठा अमर्याद असून ही ऊर्जा ग्राहकांना लोकांना फायदेशीर ठरते. निसर्ग रक्षणासाठी ती चांगली आहे कारण ती ग्रीन हाऊस गॅस उत्सर्जनाला प्रोत्साहन देत नाही. सौर ऊर्जा पासून आपण मुबलक मोठ्या प्रमाणात ऊर्जा निर्माण करू शकतो. या ऊर्जेपासून कुठल्या प्रकारचा धोका नसतो तसेच ही ऊर्जा पर्यावरणालाही हानिकारक नसते. या ऊर्जेचा जास्तीत जास्त उद्योग शेती व्यवसायासाठी वापर केल्यास पाण्याची मोठ्या प्रमाणावरती बचत होऊ शकते. तसेच भविष्यामध्ये निर्माण होणाऱ्या अडचणी कमी होऊ शकतात. अर्थशास्त्राच्या दृष्टिकोनातून पाहिले तर, हे तंत्रज्ञान भारताला 'ऊर्जा आयातदार' देशातून 'ऊर्जा निर्यातदार' बनवण्याची क्षमता ठेवते. थेट विजेमध्ये रूपांतर केले जाते. घरांच्या छतावर दिसणारे पॅनेल्स याच प्रकारातील असतात. सोलर थर्मल यामध्ये सूर्यप्रकाशाचा वापर पाणी गरम करण्यासाठी किंवा वाफ तयार करून टर्बाइन फिरवण्यासाठी केला जातो. सोलर पॅनेल सिलिकॉनपासून बनवलेले सेल्स जे प्रकाश शोषतात. इन्व्हर्टर पॅनेलद्वारे तयार होणारी दिष्ट विद्युतधारा वीज आपल्या घरातील उपकरणांसाठी प्रत्यावर्ती विद्युतधारा मध्ये बदलतो. बॅटरी रात्रीच्या वेळी वापरण्यासाठी तयार झालेली वीज साठवून ठेवते. ह्या विजेचा वापर आपण आपल्या सोयीनुसार करू शकतो. ह्या विजेपासून पशु, पक्षी, प्राणी, मनुष्य ह्यांना कोणालाही प्रकारचा धोका नसतो.

पवन ऊर्जा तंत्रज्ञान:

पवन ऊर्जा पवन चक्क्याचा वापर करून हवेच्या हालचाली द्वारे ऊर्जा एकत्रित केली जाते पवन ऊर्जा ही कधी न संपणारी आहे ती ऊर्जा नूतनीकरण करणे योग्य आहे. ऊर्जा बदलण्यासाठी ग्रीड मध्ये वापरले जाऊ शकते. त्यामुळे ती शाश्वत विकासाचे साधन बनले आहे ही ऊर्जा कधीही नष्ट न होणारी आहे. या ऊर्जेचा आपण पुन्हा पुन्हा वापर करू शकतो व ती निर्माण करू शकतो. तसेच ह्या उर्जेची आपण मोठ्याप्रमाणावर साठवणूक करू शकतो. उद्योग, व्यवसाय, शेती, अशा अनेक व्यवसायासाठी ह्या उर्जेचा वापर पुन्हापुन्हा केला जातो. वाहणाऱ्या वाऱ्यातील गतिज ऊर्जा (Kinetic Energy) वापर करून जेव्हा वीज निर्मिती केली जाते, तेव्हा त्याला 'पवन ऊर्जा' म्हणतात. वारा पवनचक्कीच्या (Wind Turbine)

पात्यांवर आदळतो, तेव्हा ती पाती फिरू लागतात.ही पाती एका 'शाफ्ट'ला जोडलेली असतात, जो पुढे एका जनरेटरला (Generator) फिरवतो. जनरेटरच्या मदतीने त्या चक्राकार गतीचे रूपांतर विद्युत ऊर्जेत होते. आता पवनचक्क्या केवळ जमिनीवरच नाही, तर समुद्रातही मोठ्या प्रमाणात उभारल्या जात आहेत.आता जमिनीएवजी खोल समुद्रात पवनचक्क्या उभारल्या जात आहेत, कारण तिथे वाऱ्याचा वेग जास्त आणि स्थिर असतो. गुजरात आणि तामिळनाडूच्या किनारपट्टीवर भारताचे पहिले मोठे मोठे प्रकल्प 2025-26 मध्ये कार्यान्वित झाले आहेत. आता 300 फुटांपेक्षा जास्त उंचीचे टॉवर्स वापरले जात आहेत, ज्यामुळे वरच्या थरातील वेगवान वाऱ्याचा वापर करणे शक्य झाले आहे.

जलविद्युत:

भारताने ब्रम्हपुत्र नदीच्या खोऱ्यात जलविद्युत वाढवण्यासाठी भारताने 77 अब्ज अमेरिकन डॉलर्स चा मोठा प्लान तयार केला आहे. भारताच्या केंद्रीय विद्युत प्राधिकरणाने 2047 पर्यंत ब्रम्हपुत्र नदी खोऱ्यातून 76 GW पेक्षा जास्त जलविद्युत क्षमता तयार करण्याचा निर्णय घेतला आहे. त्यामुळे भारतातील उद्योग, छोटे मोठे व्यवसाय, शेती यांची वाढती वीज मागणी भागवली जाणार आहे.

भारताने ऊर्जा क्षेत्रात मोठी प्रगती केली असून, जलविद्युत प्रकल्पांचा वाटा लक्षणीय आहे. 31 जानेवारी 2026 पर्यंत भारताची मोठी जलविद्युत क्षमता 51,164.66 MW इतकी झाली आहे. लघु जलविद्युत प्रकल्पामध्ये 25 MW पेक्षा कमी क्षमतेच्या प्रकल्पांतून सुमारे 5,000 MW पेक्षा जास्त वीज निर्मिती होत आहे. भारताच्या एकूण बिगर-जीवाश्म (Non-fossil) ऊर्जेमध्ये जलविद्युत हा एक प्रमुख स्तंभ आहे. सध्या भारताची एकूण पारंपारिक क्षमता 271GW पेक्षा जास्त आहे. भारत सरकारने 'Draft National Electricity Policy (NEP) 2026' जाहीर केली आहे. यामध्ये जलविद्युत प्रकल्पांवर विशेष भर देण्यात आला आहे. सौर आणि पवन उर्जेतील चढ-उतार भरून काढण्यासाठी 'स्टोरेज' म्हणून जलविद्युत प्रकल्पांकडे पाहिले जात आहे. 2026 मध्ये अनेक मोठे प्रकल्प कार्यान्वित होण्याच्या मार्गावर आहेत. एकट्या महाराष्ट्र सरकारने उदंचन जलविद्युत प्रकल्पांसाठी सुमारे 57,260 कोटी रुपयांच्या गुंतवणुकीचे सामंजस्य करार केले आहेत (उदा. वरसगाव, पानशेत, आणि घाटघर प्रकल्प). सावलकोट प्रकल्प हा जम्मू आणि काश्मीरमधील मधील महत्त्वाचा प्रकल्प भारताच्या ग्रीड सुरक्षिततेसाठी आणि सिंधू पाणी कराराच्या संदर्भात धोरणात्मकदृष्ट्या महत्त्वाचा ठरत आहे.

शेतीत आधुनिक तंत्रज्ञान:

शेतीतील आधुनिक तंत्रज्ञान ही संकल्पना आता केवळ ट्रॅक्टरपुरती मर्यादित राहिलेली नाही. 2026 मध्ये आपण 'शेती 4.0' (Agriculture 4.0) च्या युगात आहोत, जिथे माहिती तंत्रज्ञान आणि जैवतंत्रज्ञानाचा संगम झाला आहे. शेतीतील उत्पादकता वाढवण्यासाठी अलिकडील काळात A I तंत्रज्ञानाचा वापर मोठ्या प्रमाणात केला जात आहे. त्यामुळे शेतीतील उत्पादकता मोठ्याप्रमाणात वाढली आहे. शेतीत ठिबक आणि तुषार सिंचन पिकांना थेट मुळांशी पाणी देते. यामुळे पाण्याची 50% पर्यंत बचत होते आणि उत्पादनामध्ये मोठ्याप्रमाणावर वाढ देखील होते. हरितगृह आणि शेडनेट हवामानावर नियंत्रण ठेवून बिगर-हंगामातही पिके घेणे शेतकरी पसंत करू लागला आहे.संकरित बी बियाणाचा वापर करून कमी कालावधीत जास्त उत्पादन देणाऱ्या आणि रोगांना प्रतिकार करणाऱ्या बियाण्यांचा वापर शेतकरी शेतीमध्ये करू लागला आहे. शेस्तीमध्ये नवीन तंत्राद्यान, पेरणी यंत्रे, कल्टिव्हेटर्स आणि हाय-टेक हार्व्हेस्टर्सचा वापर होऊ लागला आहे. त्यामुळे शेतीत काम करणाऱ्या मजुरांची कमतरता भासत नाही. सध्याच्या काळात शेतीतील रोगाचे पाहणी करणे, कीड ओळखणे आणि औषध फवारणीसाठी ड्रोनचा वापर मोठ्या प्रमाणावर केला जात आहे. यामुळे शेतकऱ्यांचा विषाणूशी संपर्क येत नाही आणि वेळ वाचतो. शेतीतील बसवलेले सेन्सर्स, जमिनीतील ओलावा, आणि पोषक तत्वे मोजण्यात मोठी मदत करतात जे थेट शेतकऱ्यांना मोबाईलवर माहिती देतात आधुनिक यंत्राच्या माध्यमातून ग्राहकाला कळावे की त्याने खरेदी केलेले फळ कोणत्या शेतकऱ्याच्या शेतातून आले आहे. कोणत्या पिकाला भविष्यात जास्त भाव मिळेल, याचे भाकीत 'आर्टिफिशियल इंटेलिजन्स' (AI) द्वारे केले जाते. नवीन तंत्रज्ञानामुळे खते आणि मजुरीचा अनावश्यक खर्च कमी होतो.त्यामुळे जागतिक दर्जाचे उत्पादन घेतले जाते व त्यामुळे फाल्पिकाच्या निर्यातीत मोठ्याप्रमाणावर वाढ झाली आहे, (उदा. द्राक्षे, डाळिंब ह्यांची निर्यात वाढत आहे)

जलव्यवस्थापनातील तंत्रज्ञान:

जल व्यवस्थापनाचा मुख्य उद्देश उपलब्ध पाण्याचा अत्यंत कार्यक्षमतेने वापर करणे आणि पाण्याचा अपव्यय टाळणे हा आहे. भारतात सर्वाधिक पाण्याचा वापर शेतीसाठी होतो, त्यामुळे येथे तंत्रज्ञान वापरणे गरजेचे आहे. ठिबक सिंचनामुळे यामध्ये पिकांच्या मुळाशी थेट थेंब-थेंब पाणी दिले जाते. यामुळे बाष्पीभवन कमी होते आणि पाण्याची सुमारे 70% बचत होते. तुषार सिंचनामुळे पावसासारखे पाणी फवारले जाते, जे जमिनीचा पोत राखण्यास मदत करते. स्मार्ट इरीगेशन पद्धतीमध्ये 'सॉईल मॉइश्चर वापरले जातात. जमिनीतील ओलावा संपला की आपोआप पाणी सुरू होते आणि पुरेसा ओलावा झाला की बंद होते. जल पुनर्भरण आणि साठवण म्हणजेच रेन वॉटर हार्वेस्टिंग तंत्राद्वारे छतावरील पावसाचे पाणी पाईपद्वारे जमिनीत सोडणे किंवा टाकीत साठवणे फायदेशीर असते. . पाझर तलाव, सिमेंट नाला बांध किंवा विंधन विहिरीच्या माध्यमातून पावसाचे पाणी जमिनीच्या पोटात जिरवणे आणि त्या पाण्याचा पुन्हा शेतीसाठी वापर करणे शेतकऱ्यांना फायदेशीर ठरते. सांडपाणी प्रक्रिया तंत्राद्वारे शहरांमधील मैलापाणी किंवा उद्योगांमधील रासायनिक पाण्यावर प्रक्रिया करून ते पुन्हा शेतीसाठी किंवा कारखान्यांसाठी वापरणे फायदेशीर असते.

पाण्याचे वितरण करणाऱ्या पाईपलाईन्समध्ये सेन्सर्स बसवून गळती (Leakage) त्वरित शोधणे, रिमोट सेन्सिंग आणि GIS उपग्रहांच्या मदतीने भूगर्भातील पाण्याची पातळी मोजणे आणि जलस्रोतांचे मॉनिंग करणे. डिसेलिनेशन (Desalination): समुद्राच्या खऱ्या पाण्याचे गोड्या पाण्यात रूपांतर करण्याचे तंत्रज्ञान वापरल्यास त्याचा मोठ्या प्रमाणावर शेतकऱ्यांना फायदा होऊ शकतो. (उदा. इस्रायलमध्ये हे तंत्राद्यान मोठ्या प्रमाणावर वापरले जाते).

कचरा व्यवस्थापन व पुनर्चक्रण तंत्रज्ञान:

कचरा व्यवस्थापन ही केवळ कचरा उचलण्याची प्रक्रिया नसून ती एक शिस्तबद्ध प्रणाली आहे: कचरा जिथे निर्माण होतो तिथेच त्याचे ओला, सुका आणि घातक अशा भागांत वर्गीकरण करणे तसेच वर्गीकरण केलेला कचरा गोळा करून प्रक्रिया केंद्रापर्यंत पोहोचवणे गरजेचे असते व त्या कचऱ्यावर विविध भौतिक किंवा रासायनिक प्रक्रिया करून त्याचा पुनर्वापर केल्यास मोठ्या प्रमाणावर फायदा होऊ शकतो. आजच्या काळात तंत्रज्ञानामुळे कचऱ्याचे रूपांतर मौल्यवान संसाधनात करणे शक्य झाले आहे. ज्या कचऱ्यावर प्रक्रिया होऊ शकत नाही, त्याची सुरक्षित ठिकाणी विल्हेवाट लावणे गरजेचे असते कारण त्यातून पशु, पक्षी, प्राणी, लहान मुलांना धोका निर्माण होऊ शकतो. पाय्रोलीस या तंत्रज्ञानात प्लास्टिकला ऑक्सिजनशिवाय उच्च तापमानाला गरम केले जाते, ज्यामुळे त्याचे रूपांतर सिंथेटिक इंधन किंवा तेलात होते. प्लास्टिकचे लहान लहान तुकडे करून त्यापासून पुन्हा नवीन वस्तू बनवणे शक्य होते.

ई कचरा व्यवस्थापनामध्ये जुन्या मोबाईल किंवा लॅपटॉपमधून सोने, चांदी, तांबे आणि कोबाल्ट यांसारखे मौल्यवान धातू अत्याधुनिक रासायनिक प्रक्रियेद्वारे वेगळे केले जातात. याला 'अर्बन मायनिंग' असेही म्हणतात. तसेच ओल्या कचऱ्यापासून बायोगॅस निर्मिती करणे किंवा वीज तयार करणे, सूक्ष्मजीवांचा वापर करून खत निर्मिती करणे शेतीसाठी फायदेशीर असते.

1. Reduce (कमी करणे): कचरा निर्माण होईल अशा वस्तूंचा वापर कमी करणे.
2. Reuse (पुनर्वापर): वस्तू फेकून न देता पुन्हा वापरणे.
3. Recycle (पुनर्चक्रण): टाकाऊ वस्तूंपासून नवीन वस्तू तयार करणे.

कचरा व्यवस्थापन क्षेत्रात संकलन, प्रक्रिया आणि विक्री यामध्ये मोठ्या प्रमाणावर रोजगाराच्या संधी उपलब्ध आहेत.

हरित बांधकाम:

हरित बांधकाम म्हणजे अशी इमारत जिथे तिच्या नियोजनापासून ते बांधकामापर्यंत आणि वापराच्या टप्प्यापर्यंत पर्यावरणावर होणारा नकारात्मक परिणाम कमीत कमी करण्याचा प्रयत्न केला जातो. सौर पॅनेलचा वापर करून स्वतःची वीज निर्मिती करणे आणि नैसर्गिक सूर्यप्रकाशाचा असा वापर करणे जेणेकरून दिवसा विजेचे दिवे लावण्याची गरज पडणार नाही. पावसाच्या पाण्याचे नियोजन आणि वापरलेल्या सांडपाण्यावर प्रक्रिया करून त्याचा पुनर्वापर (उदा. बागेसाठी किंवा फ्लशिंगसाठी) करणे गरजेचे असते. बांधकामात उडणारी राख त्यापासून बनवलेल्या विटा, बांबू, पुनर्वापर केलेले धातू आणि

विषमुक्त रंगांचा वापर करणे महत्वाचे आहे.. इमारतीचे डिझाइन अशा प्रकारे केले जाते की नैसर्गिक वारा खेळता राहिल, ज्यामुळे एसी (AC) ची गरज कमी लागते. जरी हरित इमारतीचा सुरुवातीचा बांधकाम खर्च सामान्य इमारतीपेक्षा थोडा जास्त (सुमारे 3-५%) असला तरी दीर्घकाळात वीज आणि पाण्याच्या बिलांमध्ये मोठी बचत होते. अशा इमारतींना 'रिअल इस्टेट' मार्केटमध्ये जास्त मागणी असते आणि त्यांचे पुनर्विक्री मूल्य (Resale Value) देखील चांगले असते. हरित बांधकामामुळे पर्यावरणातील कार्बन फूटप्रिंट कमी होण्यास मदत होते. अशा बांधकाम प्रकल्पांमध्ये निसर्गाचे रक्षण आणि संवर्धन केले जाते.

स्मार्ट तंत्रज्ञानाचा वापर:

महाराष्ट्राच्या ग्रामीण भागातील विद्यार्थ्यांसाठी हे स्मार्ट तंत्रज्ञान खूप महत्वाचे आहे, जमिनीतील ओलावा आणि खतांचे प्रमाण मोजण्यासाठी सेन्सर्स वापरले जातात. पिकांवर औषध फवारणी करण्यासाठी आणि पिकांच्या वाढीवर लक्ष ठेवण्यासाठी. अचूक हवामान अंदाजावर आधारित पेरणी आणि कापणीचे नियोजन ह्या तंत्राद्यानाने केले जाते. महाराष्ट्रातील पुणे, कोल्हापूर यांसारख्या शहरांमध्ये याचा वापर मोठ्या प्रमाणावर वाढत आहे. वाहतूक कोंडी कमी करण्यासाठी स्वयंचलित सिग्नल यंत्रणा. कचरा कुंडी भरली की महापालिकेला आपोआप संदेश जाणारे सेन्सर, विजेचा वापर कमी करण्यासाठी आणि सौर ऊर्जेचे कार्यक्षम वितरण करण्यासाठी ह्या तंत्राद्यानाचा वापर केला जातो. आर्थिक व्यवहारांमध्ये पारदर्शकता आणि सुरक्षा आणण्यासाठी. शेअर बाजार, बँकिंग आणि विम्याच्या क्षेत्रात भविष्यातील कल (Trends) ओळखण्यासाठी. UPI आणि नेट बँकिंगद्वारे अर्थव्यवस्थेचे 'कॅशलेस' रूपांतर करणे स्मार्ट तंत्राद्यानामुळे शक्य झाले आहे.

उद्योगांमध्ये स्वच्छ तंत्रज्ञान:

उद्योगांमधील स्वच्छ तंत्रज्ञान ज्याला 'CleanTech' असेही म्हणतात, ही आजच्या जागतिक अर्थव्यवस्थेतील एक क्रांतिकारी संकल्पना आहे. भारतात पर्यावरणाचे रक्षण आणि औद्योगिक विकास यांचा समतोल साधण्यासाठी हे तंत्रज्ञान कळीचे ठरत आहे. स्वच्छ तंत्रज्ञान म्हणजे अशी प्रक्रिया किंवा सेवा, ज्या नैसर्गिक संसाधनांचा वापर कमी करतात आणि कचरा व प्रदूषण नष्ट किंवा लक्षणीयरीत्या कमी करतात. उद्योगांमध्ये जुन्या यंत्रांऐवजी कमी वीज वापरणारी 'स्मार्ट' यंत्रे आणि LED लायटिंगचा वापर करणे. कारखान्यांच्या छतावर सौर पॅनेल बसवणे किंवा पवन ऊर्जेचा वापर करून जीवाश्म इंधनावरील (कोळसा, डिझेल) अवलंबित्व कमी करणे. अवजड उद्योगांमध्ये (उदा. पोलाद किंवा सिमेंट उद्योग) इंधन म्हणून हायड्रोजनचा वापर करणे, ज्यामुळे कार्बन उत्सर्जन शून्य होते. कारखान्यातील सांडपाण्यावर प्रक्रिया करून (Effluent Treatment Plant - ETP) ते पुन्हा उत्पादनासाठी किंवा बागेसाठी वापरणे. किंवा काही गोष्टी स्वच्छ तंत्राद्यान म्हणून वापरल्या जातात. अनेक आधुनिक कारखाने आता एक थेंबही प्रदूषित पाणी बाहेर सोडत नाहीत; सर्व पाण्यावर प्रक्रिया करून त्याचा पुनर्वापर केला जातो. कच्चा माल मिळवण्यापासून ते तयार माल ग्राहकांपर्यंत पोहोचतेपर्यंत पर्यावरणास पूरक साधनांचा वापर करतात. सुरुवातीला हे तंत्रज्ञान महाग वाटले तरी, दीर्घकाळात वीज आणि कच्च्या मालाची बचत झाल्यामुळे कंपनीचा नफा वाढतो. युरोप आणि अमेरिकेसारखे देश आता 'कार्बन टॅक्स' लावत आहेत. जे उद्योग स्वच्छ तंत्रज्ञान वापरतात, त्यांना आंतरराष्ट्रीय बाजारपेठेत सहज प्रवेश मिळतो. आजकाल मोठे गुंतवणूकदार अशाच कंपन्यांमध्ये पैसे गुंतवतात ज्या पर्यावरणाची काळजी घेतात. या क्षेत्रात संशोधक, इंजिनिअर्स आणि विश्लेषकांसाठी रोजगाराच्या लाखो नवीन संधी निर्माण होत आहेत.

6.2) संसाधनांचे संरक्षण आणि संवर्धन केल्याने शाश्वत विकास घडून येईल:

'संसाधनांचे संरक्षण आणि संवर्धन' हा शाश्वत विकासाचा (Sustainable Development) पाया आहे. जेव्हा आपण नैसर्गिक संसाधने अशा प्रकारे वापरतो की ज्यामुळे आजच्या गरजा तर पूर्ण होतातच, पण भविष्यातील पिढ्यांसाठीही ती शिल्लक राहतात, तेव्हाच खऱ्या अर्थाने शाश्वत विकास होतो. शाश्वत विकासाची व्याख्या च्या 1987 'ब्रंडलँड रिपोर्ट' (Brundtland Report) मध्ये केली गेली. याचा मुख्य उद्देश नैसर्गिक भांडवल (Natural Capital) नष्ट न करता प्रगती साधणे हा आहे. संसाधनांचा अपव्यय टाळून त्यांचा कार्यक्षम वापर करणे. निसर्गातील संसाधने त्यांच्या मूळ स्वरूपात टिकवून ठेवणे. ह्यांसारख्या गोष्टी सध्या करता येतात. जगासमोर सध्या संसाधनांच्या अतिवापरामुळे मोठी संकटे उभी आहेत. 'वर्ल्ड

रिसोर्सेस इन्स्टिट्यूट'नुसार, 2025 पर्यंत जगातील 1.8 अब्ज लोक पूर्णपणे पाणीटंचाई असलेल्या भागात राहतील. आजही जगातील 80% ऊर्जा जीवाश्म इंधनापासून (Fossil Fuels) मिळते, जी संपणारी आहे. 'लिव्हिंग प्लॅनेट रिपोर्ट 2022' नुसार, 1970 पासून वन्यजीवांच्या संख्येत सरासरी 69% घट झाली आहे. जागतिक तापमान वाढ 1.5°C च्या मर्यादेत ठेवण्यासाठी आपल्याला 2030 पर्यंत कार्बन उत्सर्जन 45 % नी कमी करावे लागेल भारताने 2024-25 पर्यंत 450 GW अक्षय ऊर्जेचे लक्ष्य ठेवले आहे. सध्या भारत सौर ऊर्जेत जगात चौथ्या क्रमांकावर आहे. भारताकडे जगाच्या लोकसंख्येच्या 18% लोकसंख्या आहे, पण पिण्यायोग्य पाणी फक्त 4 % आहे. त्यामुळे 'जल जीवन मिशन' सारखे प्रकल्प महत्त्वाचे आहेत. 'India State of Forest Report (ISFR) 2021' नुसार, भारताचे एकूण वनक्षेत्र आणि वृक्षाच्छादन भौगोलिक क्षेत्राच्या 24.62% आहे. हे 33% पर्यंत नेण्याचे उद्दिष्ट आहे. नीती आयोगाच्या SDG इंडिया इंडेक्सनुसार, केरळ आणि तामिळनाडू सारखी राज्ये संसाधनांच्या नियोजनत आघाडीवर आहेत. संसाधने वाचवल्याने आयात खर्च कमी होतो (उदा. सौर ऊर्जेमुळे कच्च्या तेलावरील खर्च वाचतो) तसेच ग्लोबल वॉर्मिंग आणि प्रदूषण कमी होते. संसाधनांचे समान वाटप झाल्यामुळे गरिबी कमी होण्यास मदत होते ह्यांसारखे सकारात्मक फायदे घडून येतात.

7. निष्कर्ष:

शाश्वत विकासाची संकल्पना जितकी व्याप्त आहे तितकेच त्यासाठी प्रयत्न करणेही महत्त्वाचे आहेत. तंत्राद्यानाचा वापर जरी वर्तमान युगात वाढला असला तरीही त्याचा पर्यावरण पूरक वापर आपण करू शकतो. तसेच त्या तंत्राद्यानाच्या माध्यमातून शाश्वत विकास साध्य करण्यासाठी प्रयत्न करू शकतो. नाविकारनीय उर्जा तंत्राद्यान , सौर, पावन, जल विद्यात उर्जा तसेच सागरी लाटांपासून मिळणारी उर्जेचा वापर करून उर्जा निर्मितीसाठी पारंपारिक साधनांवरील आपले अवलंबित्व कमी होऊन पर्यावरण अवनती कमी होईल. शेतीक्षेत्रात प्रगत आधुनिक तंत्राद्यान वापरल्याने पाण्याची प्रमुख बचत होऊन मातीच्या सुपीक घटकांची अधोगती होणार नाही. जालव्यावास्थापनासाठी आधुनिक तंत्राद्यान वापरल्याने पाण्याचा योग्य तो वापर होईल. सोबतच बांधकामातील हरीत मार्गामुळे सार्वजनिक बांधकाम क्षेत्रात संसाधनाचा अपव्यय होणार नाही. स्मार्ट तंत्राद्यानामुळे आधुनिकीकरणाचा प्रभाव वाढत आहे ज्यामुळे पेपरलेस कामकाज होत आहे. उद्योगाच्या ठिकाणी तंत्राद्यानाचा वापरसुद्धा स्वच्छ व पर्यावरण पूरक पद्धतीने झाला पाहिजे ज्यामुळे शाश्वत विकासाचे उद्दिष्ट साधण्यासाठी मदत होईल. नैसर्गिक संसाधनाचे संरक्षण घडून आणणे हे शाश्वत विकासाचे महत्त्वाचे उद्दिष्ट आहे. ज्याद्वारे शाश्वत विकास साध्य करता येईल. वर्तमान पिढीसोबत भविष्यातील पिढीच्या गरजा पूर्ण करण्यासाठी संसाधनांचे संरक्षण आणि संवर्धन करणे नितांत गरजेचे आहे. जर वर्तमान पिढीच्या गरजा भागवताना संसाधनांचा अतिवापर किंवा दोहन झाले तर भविष्यासाठी मोठे संकट उभे राहील. .

थोडक्यात, शाश्वत विकास साध्य करताना अमर्याद गरजांचा मेळ अश्याप्रकारे घातला गेला पाहिजे कि वर्तमान गरजा सोबतच भाविष्याच्याही गरजा भागतील. सध्याचे बदलते जग मोठ्या प्रमाणावर आधुनिक होत आहे तारीही बदलत्या जगाच्या प्रत्येक रूपातून पर्यावरण पूरक परिणाम घडले पाहिजेत.

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शाश्वत विकास ध्येय ५ च्या पूर्ततेत जननी सुरक्षा योजनेची भूमिका

कु.रेश्मा चांगदेव निकम

सहाय्यक प्राध्यापक

अर्थशास्त्र विभाग

मुधोजी महाविद्यालय फलटण

ता.फलटण जि.सातारा

सारांश:-

या अध्ययनाचा मुख्य हेतू शाश्वत विकास ध्येय ५ अर्थात महिलांचे सशक्तीकरण आणि लैंगिक समानता साध्य करण्यात जननी सुरक्षा योजनेची भूमिका सखोलपणे समजावून सांगणे हा आहे. सुरक्षित मातृत्व हे महिलांच्या आरोग्य, सन्मान आणि सामाजिक सहभागाशी थेट निगडित आहे, म्हणूनच संस्थात्मक प्रसूती वाढविणे, गर्भावस्थेदरम्यान नियमित तपासण्या सुनिश्चित करणे आणि प्रसूतीनंतर आई व नवजात बाळाची योग्य काळजी घेणे ही सार्वजनिक आरोग्य व्यवस्थेची मूलभूत जबाबदारी ठरते. भारतात राबविल्या जाणाऱ्या या योजनेमुळे आर्थिक अडचणीमुळे आरोग्यसेवा टाळण्याची प्रवृत्ती कमी होते आणि महिलांना वेळेवर वैद्यकीय मदत मिळते. दुय्यम माहितीच्या आधारे केलेल्या या वर्णनात्मक अभ्यासातून असे दिसून येते की सुरक्षित प्रसूतीचे प्रमाण वाढणे, मातृ व शिशु मृत्यू दरात घट, तसेच आरोग्याविषयी जागरूकता वाढणे या सकारात्मक परिणामांमुळे महिलांच्या सशक्तीकरणाला चालना मिळते. परिणामी, आरोग्य, समान संधी आणि सन्माननीय जीवन या ध्येय ५ च्या प्रमुख घटकांना बळकटी मिळून शाश्वत विकासाच्या व्यापक उद्दिष्टांशी या योजनेचा दृढ संबंध स्पष्ट होतो.

प्रास्ताविक:-

शाश्वत विकास ही संकल्पना समाजाच्या सर्वांगीण आणि दीर्घकालीन प्रगतीशी संबंधित आहे, ज्यामध्ये सामाजिक समानता, आर्थिक स्थैर्य आणि मानवी विकास यांचा समतोल राखला जातो. महिलांचे आरोग्य आणि सुरक्षित मातृत्व हे कोणत्याही समाजाच्या प्रगतीचे महत्त्वाचे निर्देशक मानले जातात, कारण निरोगी माता म्हणजे निरोगी कुटुंब आणि सुदृढ समाज. शाश्वत विकास ध्येय ५ महिलांना समान हक्क, संधी आणि सन्मान मिळावा यावर भर देत असताना, आरोग्यसेवांमध्ये समान प्रवेश आणि सुरक्षित प्रसूती ही त्याची व्यवहार्य पायाभूत अट ठरते. भारतासारख्या मोठ्या आणि विविधतेने नटलेल्या देशात ग्रामीण व आर्थिकदृष्ट्या दुर्बल घटकांपर्यंत गुणवत्तापूर्ण आरोग्यसेवा पोहोचविणे हे मोठे आव्हान राहिले आहे. अशा पार्श्वभूमीवर संस्थात्मक प्रसूतीस प्रोत्साहन, प्रसूतीपूर्व व प्रसूतीनंतरच्या तपासण्या, तसेच आर्थिक सहाय्य या माध्यमातून महिलांच्या आरोग्य संरक्षणाला चालना देणाऱ्या उपक्रमांचे महत्त्व वाढते. प्रस्तुत अध्ययनात या संदर्भात जननी सुरक्षा योजनेची भूमिका, तिचे आरोग्य व सामाजिक परिणाम, आणि ध्येय ५ च्या पूर्ततेशी असलेला परस्परसंबंध यांचे सुसंगत विश्लेषण केले आहे.

उद्दिष्टे:-

1. जननी सुरक्षा योजना योजनेची रचना व प्रमुख वैशिष्ट्ये समजून घेणे.
2. सुरक्षित मातृत्व आणि संस्थात्मक प्रसूतीवर योजनेचा परिणाम अभ्यासणे.
3. शाश्वत विकास ध्येय ५ च्या पूर्ततेत या योजनेची भूमिका स्पष्ट करणे.

संशोधन पद्धत:-

माहिती स्रोत: सरकारी अहवाल, आरोग्य विभाग माहिती, शैक्षणिक लेख
डेटा प्रकार: दुय्यम माहिती

शाश्वत विकास म्हणजे काय

शाश्वत विकास म्हणजे वर्तमान पिढीच्या गरजा पूर्ण करताना भविष्यातील पिढ्यांच्या संधींवर परिणाम न होऊ देता समाजाची प्रगती साधणे होय. या संकल्पनेत सामाजिक न्याय, समान संधी, आरोग्यदायी जीवनमान आणि मानवी सन्मान यांना केंद्रस्थानी स्थान दिले जाते. आर्थिक प्रगतीसोबतच मानवी विकासाचे निर्देशक जसे शिक्षण, आरोग्य आणि सुरक्षितता यांचा समतोल राखणे आवश्यक ठरते. महिलांचे आरोग्य, पोषण, शिक्षण आणि निर्णयक्षमता हे शाश्वत विकासाचे महत्त्वाचे आधारस्तंभ आहेत, कारण महिलांचे सशक्तीकरण झाल्यास कुटुंब आणि समुदायाच्या प्रगतीला गती मिळते. सुरक्षित मातृत्व, गुणवत्तापूर्ण आरोग्यसेवा आणि सामाजिक संरक्षण या घटकांद्वारे समाजातील असमानता कमी करण्यास मदत होते. म्हणूनच शाश्वत विकासाच्या दृष्टीने आरोग्यसेवांचा सर्वसमावेशक विस्तार आणि दुर्बल घटकांपर्यंत पोहोच हा मूलभूत उद्देश मानला जातो.

शाश्वत विकास ध्येय ५:-

शाश्वत विकास ध्येय ५ हे महिलांचे सशक्तीकरण आणि लैंगिक समानता साध्य करण्यावर केंद्रित आहे. या ध्येयाचा गाभा असा की महिलांना आरोग्य, शिक्षण, रोजगार आणि निर्णयप्रक्रियेत समान संधी मिळाल्यास समाज अधिक न्याय्य आणि प्रगतिशील बनतो. सुरक्षित मातृत्व हा या ध्येयाचा व्यवहार्य आणि मूलभूत घटक आहे, कारण गर्भावस्था व प्रसूतीदरम्यानची सुरक्षितता महिलांच्या जीवनगुणवत्तेला थेट प्रभावित करते. आरोग्यसेवांमध्ये समान प्रवेश, गुणवत्तापूर्ण वैद्यकीय सुविधा आणि आर्थिक सहाय्य यांमुळे महिलांचे स्वावलंबन वाढते आणि कुटुंबातील तसेच समाजातील त्यांचा दर्जा उंचावतो. महिलांच्या आरोग्याविषयी जागरूकता, पोषण आणि नियमित तपासण्या यांमुळे दीर्घकालीन सामाजिक परिणाम घडून येतात. या सर्व घटकांचा एकत्रित परिणाम म्हणून ध्येय ५ अंतर्गत समानता, सन्मान आणि सशक्तीकरण या मूल्यांना बळकटी मिळते.

जननी सुरक्षा योजनेची ओळख:-

जननी सुरक्षा योजना ही भारत सरकारची सुरक्षित मातृत्वाला प्रोत्साहन देणारी एक महत्त्वपूर्ण सार्वजनिक आरोग्य योजना असून ती 2005 साली राष्ट्रीय ग्रामीण आरोग्य अभियानाच्या अंतर्गत सुरू करण्यात आली. या योजनेचा मूलभूत उद्देश गर्भवती महिलांना सुरक्षित, संस्थात्मक आणि वैद्यकीय देखरेखीखाली प्रसूतीची संधी उपलब्ध करून देणे हा आहे. विशेषतः आर्थिकदृष्ट्या दुर्बल, ग्रामीण आणि सामाजिकदृष्ट्या वंचित घटकांतील महिलांना गुणवत्तापूर्ण आरोग्यसेवांपर्यंत पोहोच मिळावी यासाठी या योजनेत आर्थिक प्रोत्साहनाची तरतूद करण्यात आली आहे. गर्भवती महिलेची नोंदणी, नियमित प्रसूतीपूर्व तपासण्या, आवश्यक सल्ला, प्रसूतीदरम्यान वैद्यकीय सहाय्य आणि प्रसूतीनंतर आई व नवजात बाळाची काळजी या सेवा आरोग्य व्यवस्थेद्वारे समन्वयित पद्धतीने पुरवल्या जातात. आशा कार्यकर्त्यांच्या माध्यमातून लाभार्थ्यांपर्यंत माहिती पोहोचविणे, आरोग्य संस्थेशी संपर्क सुलभ करणे आणि वेळेवर सेवा मिळवून देणे हे या योजनेचे कार्यात्मक वैशिष्ट्य आहे. यामुळे संस्थात्मक प्रसूतीचे प्रमाण वाढते, गर्भधारणेदरम्यान उद्धवणाऱ्या गुंतागुंतीची लवकर ओळख होते आणि आवश्यक उपचार वेळेत उपलब्ध होतात. परिणामी मातृ व शिशु मृत्यूदर कमी करण्यास मदत होते आणि महिलांच्या आरोग्याविषयी जागरूकता वाढीस लागते.

शाश्वत विकासाच्या दृष्टीने या योजनेचे महत्त्व विशेष अधोरेखित होते. सुरक्षित मातृत्व, आरोग्य सेवांमध्ये समान प्रवेश आणि आर्थिक अडथळे कमी करणे या माध्यमातून महिलांच्या सन्माननीय जीवनमानाला बळकटी मिळते, जे शाश्वत विकास ध्येय ५ च्या प्रमुख तत्वांशी सुसंगत आहे. आरोग्य संरक्षणामुळे महिलांची निर्णयक्षमता आणि सामाजिक सहभाग वाढतो, कुटुंबातील त्यांच्या भूमिकेला मान्यता मिळते आणि दीर्घकालीन सामाजिक विकासाला चालना मिळते. सार्वजनिक आरोग्य व्यवस्थेचा विस्तार, स्थानिक पातळीवरील समन्वय आणि जागरूकता या घटकांमुळे ही योजना केवळ आरोग्य सेवा पुरविण्यावर मर्यादित न राहता महिलांच्या सशक्तीकरणाची प्रक्रियाही दृढ करते. अशा प्रकारे सुरक्षित प्रसूतीचे प्रोत्साहन, मातृ-आरोग्याचे संरक्षण आणि सामाजिक समानतेचा विस्तार या सर्वांद्वारे ही योजना शाश्वत विकासाच्या उद्दिष्टांच्या पूर्ततेस महत्त्वपूर्ण हातभार लावते.

शाश्वत विकास ध्येय ५ मध्ये जननी सुरक्षा योजनेची भूमिका:-

1. जननी सुरक्षा योजना संस्थात्मक प्रसूतीला प्रोत्साहन देऊन सुरक्षित मातृत्व सुनिश्चित करते.
2. आर्थिक सहाय्यामुळे गर्भवती महिलांना वेळेवर वैद्यकीय सेवा घेणे शक्य होते.
3. ग्रामीण आणि आर्थिकदृष्ट्या दुर्बल घटकांतील महिलांपर्यंत आरोग्य सेवा पोहोचवते.
4. प्रसूतीपूर्व व प्रसूतीनंतरच्या तपासण्यांमुळे मातृ व शिशु मृत्यूदर कमी होण्यास मदत होते.
5. आरोग्याविषयी जागरूकता वाढवून महिलांची निर्णयक्षमता मजबूत करते.
6. महिलांच्या आरोग्य संरक्षणामुळे त्यांच्या सामाजिक सशक्तीकरणाला चालना मिळते.

निष्कर्ष:-

1. सुरक्षित मातृत्व महिलांच्या सशक्तीकरणाशी थेट संबंधित आहे.
2. जननी सुरक्षा योजना मुळे संस्थात्मक प्रसूती आणि आरोग्य सेवा वापर वाढतो.
3. मातृ व शिशु मृत्यूदर कमी करण्यास योजना उपयुक्त ठरते.
4. महिलांच्या आरोग्य संरक्षणामुळे सामाजिक आणि वैयक्तिक सशक्तीकरण घडते.
5. शाश्वत विकास ध्येय ५ साध्य करण्यासाठी ही योजना महत्त्वपूर्ण ठरते.
6. आरोग्य सेवांमध्ये समान प्रवेश उपलब्ध करून सामाजिक असमानता कमी करण्यास मदत होते.
7. महिलांच्या सन्माननीय व सुरक्षित जीवनमानाला बळकटी मिळते.
8. निरोगी मातृत्वाद्वारे कुटुंब व समाजाच्या दीर्घकालीन विकासाला आधार मिळतो.
9. या सर्व घटकांमुळे शाश्वत विकास ध्येय ५ अंतर्गत महिलांच्या सशक्तीकरणाच्या प्रक्रियेला गती मिळते.

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महाराष्ट्र राज्यातील सेंद्रिय शेतीच्या क्षेत्र आणि उत्पादनाचा अभ्यास

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गोष्टवारा

भारत हा कृषिप्रधान देश आहे. भारतात अनेक शेती पद्धती दिसून येतात. त्यातीलच एक पर्यावरण पूरक शेती प्रकार म्हणजे सेंद्रिय शेती होय. शेतकरी आणि ग्राहकांमध्ये वाढलेल्या शाश्वत शेती विकासाबाबतच्या जागरूकतेमुळे भारतात सेंद्रिय पिकांच्या उत्पादनात सातत्यपूर्ण वाढ दिसून आली आहे. सेंद्रिय शेती खालील सर्वात जास्त क्षेत्र असलेल्या पहिल्या १० देशांच्या यादीत भारताचे नाव आहे. तर सेंद्रिय कृषी उत्पादनात महाराष्ट्र राज्याचा भारतात दुसरा क्रमांक लागतो. महाराष्ट्रात विदर्भ, मराठवाडा, कोकण यांसारख्या विभागांमध्ये आणि पुणे, नाशिक आणि अमरावतीसह अनेक जिल्ह्यांमध्ये सेंद्रिय शेतीच्या उपक्रमांमध्ये वाढ झाली आहे. राज्यात अनेक सेंद्रिय प्रमाणीकरण संस्था देखील आहेत, ज्या शेतकऱ्यांना सेंद्रिय लेबल मिळवून देण्यास मदत करतात आणि त्यामुळे त्यांना बाजारात चांगल्या संधी मिळतात. याव्यतिरिक्त, सेंद्रिय शेतकऱ्यांना थेट ग्राहकांशी जोडण्यासाठी सेंद्रिय बाजारपेठा आणि शेतकरी-उत्पादक संस्था स्थापन करण्यात आल्या आहेत. महाराष्ट्र आणि संपूर्ण भारतात सेंद्रिय शेती शाश्वत शेतीला प्रोत्साहन देण्यासाठी, जमिनीची सुपीकता सुधारण्यासाठी आणि अन्न सुरक्षा सुनिश्चित करण्यासाठी महत्त्वपूर्ण भूमिका बजावते. उच्च उत्पादन खर्च, प्रमाणीकरणाच्या समस्या आणि बाजारपेठेतील प्रवेशासारखी आव्हाने कायम असली तरी, फायदे तोट्यांपेक्षा जास्त आहेत. सरकार, स्वयंसेवी संस्था आणि खाजगी क्षेत्राच्या सततच्या पाठिंब्यामुळे, सेंद्रिय शेतीचा आणखी विस्तार होण्याची अपेक्षा आहे, ज्यामुळे निरोगी पर्यावरणाला आणि शेतकऱ्यांसाठी चांगल्या उपजीविकेला हातभार लागेल.

मुख्य शब्द: - सेंद्रिय शेती, शाश्वत शेती, क्षेत्र, उत्पादन, महाराष्ट्र राज्य आणि भारत.

प्रस्तावना-

अलीकडच्या वर्षात भारतात सेंद्रिय शेतीने महत्त्वपूर्ण गती घेतली आहे, कारण शेतकरी आणि ग्राहक रासायनिक शेतीचे दुष्परिणाम आणि शाश्वत शेतीचे फायदे ओळखू लागले आहेत. आज सामान्य ग्राहकांसाठी अन्नाची गुणवत्ता व सुरक्षितता महत्वाची आहे. सेंद्रिय शेतीच्या पद्धतीत कृत्रिम खते, कीटकनाशके आणि जनुकीय सुधारित जीवांचा (GMOs) वापर टाळला जातो, त्याऐवजी नैसर्गिक प्रक्रिया, जैवविविधता आणि जमिनीच्या आरोग्यावर लक्ष केंद्रित केले जाते. भारत सरकार, विविध संस्थांसोबत, धोरणे, अनुदान आणि प्रमाणीकरण कार्यक्रमांद्वारे सेंद्रिय शेतीला प्रोत्साहन देत आहे. आपल्या विशाल शेतजमिनी आणि विविध हवामान परिस्थितीमुळे, भारत सेंद्रिय शेतीमध्ये जगातील अग्रगण्य देशांपैकी एक बनला आहे. भारतातील सेंद्रिय शेतीखालील एकूण क्षेत्रात सातत्याने वाढ होत आहे. अलीकडील अहवालानुसार, भारतात ४ दशलक्ष हेक्टरपेक्षा जास्त जमीन सेंद्रिय शेतीसाठी समर्पित आहे, ज्यामुळे भारत जागतिक स्तरावर शीर्ष सेंद्रिय उत्पादकांपैकी एक बनला आहे. मध्य प्रदेश, राजस्थान, महाराष्ट्र आणि उत्तर प्रदेश यांसारखी राज्ये सेंद्रिय शेतीमध्ये महत्त्वपूर्ण योगदान देतात. भारतात सेंद्रिय पद्धतीने पिकवल्या जाणाऱ्या प्रमुख पिकांमध्ये तृणधान्ये, कडधान्ये, मसाले, फळे आणि भाज्या यांचा समावेश आहे. सेंद्रिय उत्पादनांच्या वाढत्या मागणीमुळे निर्यातीतही वाढ झाली आहे, ज्यामुळे भारताच्या कृषी अर्थव्यवस्थेला हातभार लागत आहे.

महाराष्ट्र हे कृषीदृष्ट्या समृद्ध राज्य असल्याने, भारताच्या सेंद्रिय शेतीच्या चळवळीत एक प्रमुख राज्य म्हणून त्याने आपली ओळख निर्माण केली आहे. महाराष्ट्र राज्यात अनुकूल कृषी-हवामान परिस्थिती आहे, जी कापूस, कडधान्ये, तेलबिया आणि आंबे व केळी यांसारख्या विविध सेंद्रिय पिकांच्या व फळांच्या लागवडीस मदत करते. महाराष्ट्रातील अनेक

शेतकरी गट आणि सहकारी संस्थांनी सेंद्रिय शेतीचा स्वीकार केला आहे, ज्यामुळे जमिनीचे आरोग्य सुधारले आहे, पाण्याची बचत झाली आहे आणि रासायनिक निविष्टांवरील अवलंबित्व कमी झाले आहे. शिवाय, महाराष्ट्र सरकारने सेंद्रिय शेतीच्या पद्धतींना प्रोत्साहन देण्यासाठी धोरणे आणि आर्थिक सहाय्य सुरू केले आहे. राज्यात शाश्वत कृषी पद्धतीमध्ये वाढ होताना दिसत आहे. शेतकरी आणि ग्राहकांमध्ये वाढलेल्या जागरूकतेमुळे महाराष्ट्रातील सेंद्रिय पिकांच्या उत्पादनात सातत्यपूर्ण वाढ दिसून आली आहे. विदर्भ, मराठवाडा, कोकण, पुणे, नाशिक आणि अमरावती यांसारख्या विभागांमध्ये सेंद्रिय शेतीच्या उपक्रमांमध्ये वाढ झाली आहे. राज्यात अनेक सेंद्रिय प्रमाणीकरण संस्था देखील आहेत, ज्या शेतकऱ्यांना सेंद्रिय लेबल मिळविण्यात मदत करतात, ज्यामुळे त्यांना बाजारात चांगल्या संधी मिळतात. याव्यतिरिक्त, सेंद्रिय शेतकऱ्यांना थेट ग्राहकांशी जोडण्यासाठी सेंद्रिय बाजारपेठा आणि शेतकरी-उत्पादक संस्था स्थापन करण्यात आल्या आहेत.

महाराष्ट्र आणि संपूर्ण भारतातील सेंद्रिय शेती ही शाश्वत शेतीला प्रोत्साहन देण्यासाठी, जमिनीची सुपीकता सुधारण्यासाठी आणि अन्न सुरक्षा सुनिश्चित करण्यासाठी महत्त्वपूर्ण भूमिका बजावते. उच्च निविष्टा खर्च, प्रमाणीकरणाच्या समस्या आणि बाजारपेठेतील प्रवेशासारखी आव्हाने कायम असली तरी, फायदे तोट्यांपेक्षा जास्त आहेत. सरकार, स्वयंसेवी संस्था आणि खाजगी क्षेत्राच्या सततच्या पाठिंब्याने, सेंद्रिय शेतीचा आणखी विस्तार होण्याची अपेक्षा आहे, ज्यामुळे निरोगी पर्यावरणाला आणि शेतकऱ्यांसाठी चांगल्या उपजीविकेला हातभार लागेल. वनस्पती, प्राणी, मानव यांच्या दीर्घकालीन अस्तित्वासाठी आता सेंद्रिय शेतीशिवाय पर्याय नाही.

अभ्यासाचे महत्त्व

या अभ्यासाचे महत्त्व भारतातील कृषी शाश्वतता, पर्यावरणीय आरोग्य आणि आर्थिक वाढीवर सेंद्रिय शेतीच्या परिणामाचे आकलन करण्यात आले आहे, ज्यामध्ये महाराष्ट्रावर विशेष लक्ष केंद्रित केले आहे. सेंद्रिय शेती रासायनिक निविष्टांवरील अवलंबित्व कमी करते, जमिनीची सुपीकता वाढवते, जैवविविधतेला प्रोत्साहन देते आणि सुरक्षित अन्न उत्पादनाची खात्री देते. महाराष्ट्रात, जिथे शेती हे उपजीविकेचे प्रमुख साधन आहे, तिथे सेंद्रिय शेती लहान आणि अल्पभूधारक शेतकऱ्यांना प्रीमियम किंमत आणि निर्यातीच्या संभाव्यतेद्वारे त्यांचे उत्पन्न सुधारण्याची संधी देते. हा अभ्यास सेंद्रिय शेतीच्या वाढीवर परिणाम करणाऱ्या सरकारी धोरणे, आव्हाने आणि बाजारातील प्रवृत्तींवर देखील प्रकाश टाकतो, ज्यामुळे धोरणकर्ते, शेतकरी आणि ग्राहकांना शाश्वत कृषी पद्धतींना पाठिंबा देण्यासाठी आणि त्यांचा विस्तार करण्यासाठी अंतर्दृष्टी मिळते.

अभ्यासाची उद्दिष्टे

१. महाराष्ट्राच्या विशेष संदर्भात भारतातील सेंद्रिय शेतीचे क्षेत्र आणि उत्पादनाचा अभ्यास करणे.
२. आवश्यक असल्यास सुधारणेसाठी उपाययोजना सुचवणे.

संशोधन पद्धती

सदर शोध निबंध हा फक्त दुय्यम सामग्रीवर आधारित आहे. या शोध निबंधातील माहिती ही विविध पुस्तके, नियतकालिके, गॅझेटियर, आरबीआय अहवाल, स्रोत: कृषी आयुक्त, महाराष्ट्राचा आर्थिक पाहणी अहवाल २०१८-१९ ते २०२३-२४ यांमधून गोळा केली आहे. सदर शोध निबंधामध्ये वर्णनात्मक व विश्लेषणात्मक संशोधन पद्धतीचा वापर केला आहे.

अभ्यासाची मर्यादा

महाराष्ट्राच्या विशेष संदर्भात भारतातील सेंद्रिय शेतीचे क्षेत्र आणि उत्पादन या संशोधनाची मर्यादा ही आहे की, हे संशोधन केवळ २०१८-१९ ते २०२३-२४ या कालावधीतील सेंद्रिय शेतीचे क्षेत्र आणि उत्पादनाशी संबंधित आहे आणि या संशोधनाचे निष्कर्ष इतर क्षेत्रांना लागू होणार नाही.

डेटा विश्लेषण आणि स्पष्टीकरण

खालील तक्ता क्रमांक १ मध्ये, महाराष्ट्राच्या विशेष संदर्भात भारतातील सेंद्रिय शेतीचे क्षेत्र आणि उत्पादनाच्या २०१८-१९ ते २०२३-२४ या कालावधीतील आकडेवारीचे विश्लेषण पुढील प्रमाणे करण्यात आले आहे.

अनु.क्र.	वर्ष	महाराष्ट्र		भारत	
		क्षेत्र (हेक्टर)	उत्पादन (मे.टन)	क्षेत्र (हेक्टर)	उत्पादन (मे.टन)
१	२०१८-१९	२६१.५७	८६१	३४२.८६	२६४५
२	२०१९-२०	२९३.१४	९०५	३६६.९८	२७४६
३	२०२०-२१	३७१.८०	७७६	४३३.९२	३४९७
४	२०२१-२२	११३३.६७	६९१	९११९.८७	३४१०
५	२०२२-२३	१२८४.३१	७९०	५३९१.७९	२९५३
६	२०२३-२४	१००१.०८	११६१	४४७५.८३	३५५०
एकुण		४३४५.५७	५१८४	२०१३१.२५	१८८०१
सरासरी		७२४.२६	८६४.००	३३५५.२१	३१३३.५०
प्रमाणित विचलन		४६५.२०	१६३.१२	३६१०.३३	४००.८६
भिन्नतेचे गुणांक		६४.२३	१८.८८	१०७.६०	१२.७९
चक्रवाढ वाढीचा वार्षिक दर		०.३१	०.०६	०.६७	०.०६
कमाल		१२८४.३१	११६१	९११९.८७	३५५०
किमान		२६१.५७	६९१	३४२.८६	२६४५

स्रोत- कृषी आयुक्तालय महाराष्ट्र शासन, महाराष्ट्र आर्थिक पाहणी अहवाल २०२४-२५

- १) २०१८-१९ ते २०२३-२४ या कालावधीत महाराष्ट्र राज्यातील सेंद्रिय शेतीच्या क्षेत्राची सरासरी अनुक्रमे ७२४.२६ हजार हेक्टर होती. महाराष्ट्र राज्यातील सेंद्रिय शेतीच्या क्षेत्राचा चक्रवाढ वार्षिक वाढीचा दर अनुक्रमे ०.३१ टक्के होता. महाराष्ट्र राज्यातील सेंद्रिय शेतीच्या क्षेत्राचा भिन्नतेचे गुणांक अनुक्रमे ६४.२३ टक्के होता. महाराष्ट्र राज्यातील कमाल सेंद्रिय शेतीचे क्षेत्र १२८४.३१ हजार हेक्टर नोंदवले गेले आहे. त्याचप्रमाणे, अभ्यास कालावधीत महाराष्ट्र राज्यातील किमान सेंद्रिय शेतीचे क्षेत्र २६१.५७ हजार हेक्टर होते. थोडक्यात असे म्हणता येईल की, महाराष्ट्र राज्यातील सेंद्रिय शेतीचे क्षेत्र वाढत्या प्रवृत्तीचे आहे.
- २) २०१८-१९ ते २०२३-२४ या कालावधीत महाराष्ट्र राज्यातील सेंद्रिय शेतीच्या उत्पादनाची सरासरी अनुक्रमे ८६४.०० हजार मेट्रिक टन होती. महाराष्ट्र राज्यातील सेंद्रिय शेतीच्या उत्पादनाचा चक्रवाढ वार्षिक वाढीचा दर अनुक्रमे ०.०६ टक्के होता. महाराष्ट्र राज्यातील सेंद्रिय शेतीच्या उत्पादनाचा भिन्नतेचा गुणांक अनुक्रमे १८.८८ टक्के होता. महाराष्ट्र राज्यातील कमाल सेंद्रिय शेतीचे उत्पादन ११६१ हजार मेट्रिक टन नोंदवले गेले आहे. त्याचप्रमाणे, अभ्यास कालावधीत महाराष्ट्र राज्यातील किमान सेंद्रिय शेतीचे उत्पादन ६९१ हजार मेट्रिक टन होते. थोडक्यात असे म्हणता येईल की, महाराष्ट्र राज्यातील सेंद्रिय शेतीचे उत्पादन चढ-उताराच्या प्रवृत्तीचे आहे.
- ३) २०१८-१९ ते २०२३-२४ या कालावधीत भारतातील सेंद्रिय शेतीच्या क्षेत्राची सरासरी अनुक्रमे ३३५५.२१ हजार हेक्टर होती. भारतातील सेंद्रिय शेतीच्या क्षेत्राचा चक्रवाढ वार्षिक वाढीचा दर अनुक्रमे ०.६७ टक्के होता. भारतातील सेंद्रिय शेतीच्या क्षेत्राचा भिन्नतेचा गुणांक अनुक्रमे १०७.६० टक्के होता. भारतातील कमाल सेंद्रिय शेतीचे क्षेत्र ९११९.८७ हजार हेक्टर नोंदवले गेले आहे. त्याचप्रमाणे, अभ्यास कालावधीत भारतातील किमान सेंद्रिय शेतीचे क्षेत्र ३४२.८६ हजार हेक्टर होते. थोडक्यात असे म्हणता येईल की, भारतातील सेंद्रिय शेतीचे क्षेत्र वाढत्या प्रवृत्तीचे आहे.
- ४) २०१८-१९ ते २०२३-२४ या कालावधीत भारतातील सेंद्रिय शेती उत्पादनाची सरासरी ३१३३.५० हजार मेट्रिक टन होती. भारतातील सेंद्रिय शेती उत्पादनाचा चक्रवाढ वार्षिक वाढीचा दर ०.०६ टक्के होता. भारतातील सेंद्रिय शेती उत्पादनाचा विचरण गुणांक १२.७९ टक्के होता. भारतातील सर्वाधिक सेंद्रिय शेती उत्पादन ३५५० हजार मेट्रिक टन नोंदवले गेले

आहे. त्याचप्रमाणे, अभ्यास कालावधीत भारतातील किमान सेंद्रिय शेती उत्पादन २६४५ हजार मेट्रिक टन होते. थोडक्यात असे म्हणता येईल की, भारतातील सेंद्रिय शेती उत्पादनात चढ-उतार होत आहे.

निष्कर्ष -

महाराष्ट्रात सेंद्रिय शेतीखालील क्षेत्र सातत्याने वाढ होताना दिसत आहे. आणि उत्पादनात चढ-उतार होत आहे. २०२०-२१ ते २०२१-२२ हा कालावधी वगळता महाराष्ट्रात सेंद्रिय शेती उत्पादनात वाढ होताना दिसत आहे. सेंद्रिय शेतीकडे शेतकऱ्यांचा कल वाढताना दिसत आहे. शाश्वत शेती विकासासाठी ही एक जमेची बाजू आहे. चांगले आरोग्य, अन्नसुरक्षा, गुणवत्तापूर्ण आणि सकस अन्नधान्य, पर्यावरण संरक्षण याबाबत नागरिकांमध्ये जागरूकता निर्माण होत आहे त्यामुळे सेंद्रिय शेतीचे आणि सेंद्रिय उत्पादनाचे महत्त्व वाढताना दिसत आहे. सेंद्रिय शेती करत असताना सुरुवातीला उत्पादन कमी होते. मात्र दोन-तीन वर्षांनंतर उत्पादनात वाढ होऊन उत्पादन खर्चात घट होत आहे. सेंद्रिय शेतीसाठी महाराष्ट्रातच नव्हे तर संपूर्ण भारतात वाव आहे तसेच सेंद्रिय शेती उत्पादनाला आंतरराष्ट्रीय बाजारात खूप मागणी आहे. असे असूनही अनेक शेतकरी सेंद्रिय शेतीकडे वळण्यास साशंक आहेत. त्यासाठी शेतकऱ्यांच्यात अजूनही जागरूकतेची गरज आहे. भारतात सेंद्रिय शेतीसाठी असलेल्या योजनांची माहिती व अंमलबजावणी प्रभावीपणे होणे गरजेचे आहे. तरच सेंद्रिय शेतीसाठी पोषक वातावरण तयार होईल.

सूचना -

१. जागरूकता आणि प्रशिक्षणात वाढ — शेतकऱ्यांना सेंद्रिय शेतीच्या तंत्रांबद्दल, प्रमाणीकरण प्रक्रियांबद्दल आणि बाजारातील संधींबद्दल प्रशिक्षित करण्यासाठी शैक्षणिक कार्यक्रम, कार्यशाळा आणि प्रात्यक्षिके आयोजित केली पाहिजेत.
२. शासकीय पाठिंबा — विशेषतः महाराष्ट्रातील शेतकऱ्यांना पारंपरिक शेतीकडून सेंद्रिय शेतीकडे वळण्यासाठी प्रोत्साहित करण्यासाठी अधिक अनुदान, प्रोत्साहन आणि कमी व्याजदराची कर्जे दिली पाहिजेत.
३. सेंद्रिय शेतीचे क्षेत्र वाढविणे — योग्य प्रदेश निश्चित करून आणि सेंद्रिय उत्पादनाखालील लागवडीयोग्य जमीन वाढवण्यासाठी सेंद्रिय शेतीच्या पद्धती मोठ्या प्रमाणावर अवलंबण्यास प्रोत्साहन द्यावे.
४. संशोधन आणि नाविन्याला चालना देणे — महाराष्ट्राच्या हवामानासाठी योग्य असलेल्या चांगल्या सेंद्रिय शेती तंत्रांचा, नैसर्गिक कीटक नियंत्रण पद्धतींचा आणि अधिक उत्पादन देणाऱ्या सेंद्रिय पिकांच्या जातींचा विकास करण्यासाठी संशोधन संस्थांमध्ये गुंतवणूक करणे.
५. पुरवठा साखळी आणि पायाभूत सुविधा मजबूत करणे — काढणीनंतरचे नुकसान कमी करण्यासाठी आणि सेंद्रिय उत्पादने चांगल्या स्थितीत ग्राहकांपर्यंत पोहोचतील याची खात्री करण्यासाठी चांगल्या साठवणूक, वाहतूक आणि प्रक्रिया सुविधा विकसित करणे.
६. देशांतर्गत आणि निर्यात बाजारपेठांचा विस्तार — सेंद्रिय शेती प्रमाणनासाठीची प्रक्रिया वेळखाऊ व खर्चिक आहे त्यामुळे शेतकरी अडचणीत येतात म्हणून ब्रँडिंग आणि प्रमाणीकरणाद्वारे देशांतर्गत बाजारपेठेत सेंद्रिय उत्पादनांना प्रोत्साहन दिले पाहिजे, तसेच भारतीय सेंद्रिय उत्पादनांची जागतिक मागणी वाढवण्यासाठी निर्यात धोरणे मजबूत केली पाहिजेत.
७. दीर्घकालीन वाढीसाठी धोरणात्मक सुधारणा- सेंद्रिय शेतीला मुख्य प्रवाहातील शेतीमध्ये समाविष्ट करण्यासाठी आणि महाराष्ट्र व संपूर्ण भारतातील शेतकऱ्यांसाठी एक शाश्वत व फायदेशीर व्यवसाय बनवण्यासाठी दीर्घकालीन धोरणे विकसित करावी.

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Assessment of Land Use Land Cover Change Detection of Karad Tehsil Using GIS Techniques

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Abstract

This research uses remote sensing (RS) and geographic information system (GIS) techniques to study changes in land use and land cover (LULC) in Karad Tehsil, Satara District, between 1990 and 2020. Changes in agriculture, settlements, bare land, forests, and water bodies were evaluated using Landsat satellite data. The results show that whereas barren land decreased from 55.03% to 35.83%, agricultural land and settlements increased significantly from 41.24% to 55.54 percent and 0.77% to 5.83 percent, respectively. While water bodies marginally expanded as a result of irrigation efforts, forest cover declined. In order to handle growing ecological difficulties and developmental demands, the study highlights the necessity of sustainable land management.

Keyword:- Land Use Land Cover, GIS, Remote Sensing (RS),

1.1 Introduction

The terms land cover and land use are often used interchangeably; their actual meanings are quite distinct. Land cover refers to the surface cover on the ground, whether vegetation, urban infrastructure, water bodies, barren land, soil or other. Identifying, delineating and mapping land cover is important for global monitoring studies, resource management, and planning activities. Identification of land cover establishes the baseline from which monitoring activities (change detection) can be performed, and provides the ground cover information for baseline thematic maps. Although the terms “land cover (LC)” and “land use (LU)” are sometimes used interchangeably, they are actually different. Simply put, land cover is what covers the surface of the earth and land use describes how the land is used. Examples of land cover classes include: water, snow, grassland, deciduous forest, and bare soil.

Land use refers to the purpose the land serves, for example, recreation, wildlife habitat, or agriculture. Land use applications involve both baseline mapping and subsequent monitoring, since timely information is required to know what current quantity of land is in what type of use and to identify the land use changes from year to year. This knowledge will help develop strategies to balance conservation, conflicting uses, and developmental pressures. Issues driving land use studies include the removal or disturbance of productive land, urban encroachment, and depletion of forests. Land use examples include: wildlife management area, agricultural land, urban, recreation area etc. Two land parcels may have similar land cover, but different land use. For instance, A golf course and an office building are both commercial land uses. The former would have a land cover of grass, while the latter would be considered built up.

1.2 Objectives: -

- To analyse the Land Use Land Cover Change Detection of the Karad Tehsil from 1990 to 2020.

1.3 Significance of the Study: -

The terms land use and land cover are often used interchangeably, but each term has its own unique meaning. Land cover refers to the surface cover on the ground like vegetation, urban infrastructure, water, bare soil etc. Identification of land cover establishes the baseline information for activities like thematic mapping and change detection analysis. Land use refers to the purpose the land serves, for example, recreation, wildlife habitat, or agriculture. When used together with the phrase Land Use / Land Cover (LULC) generally refers to the categorization or classification of human activities and natural elements on

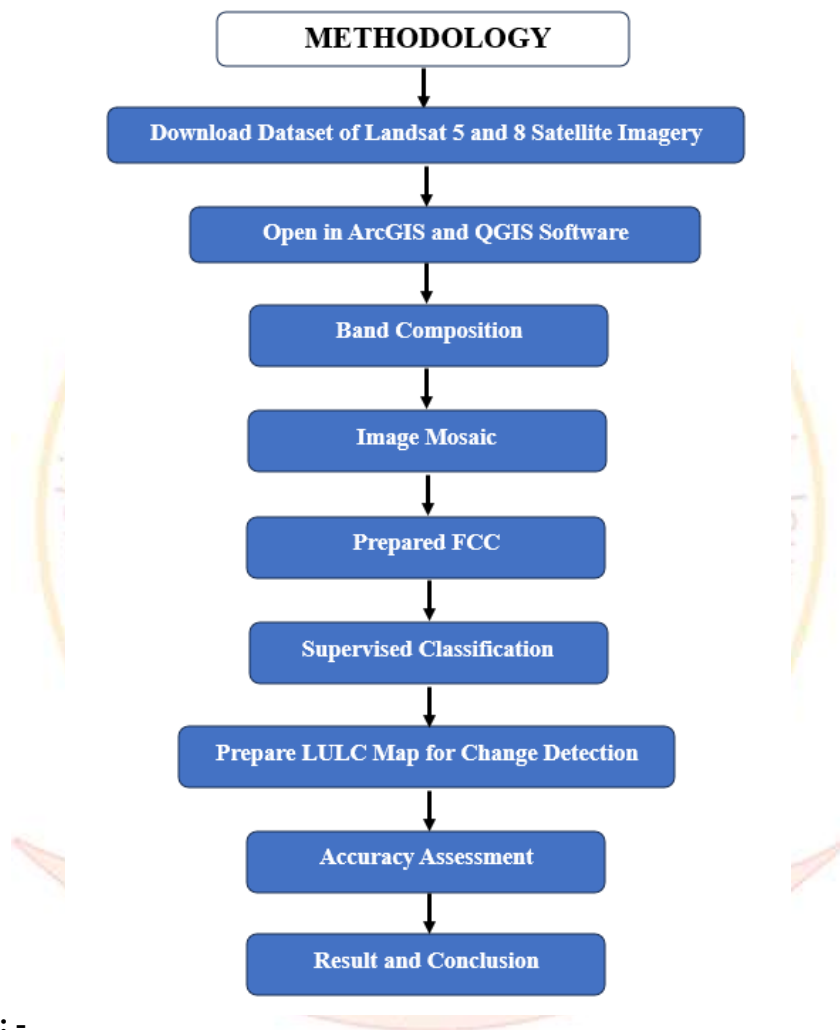
the landscape within a specific time frame based on established scientific and statistical methods of analysis of appropriate source materials.

1.4 Data Collection: -

In the present study, multi-temporal LANDSAT satellite data of Karad Tehsil were acquired for two years namely, 1990 and 2020. I have Download all the imageries in the month of April. All the LANDSAT images have been taken from USGS (United States Geological Survey) Earth Explorer Website Developed by NASA. The Landsat 5 Sensor TM (Thematic Mapper) 1990 image and image, and Landsat 8 OLI Sensor (Operational Land Imager) in 2020 year having resolution of 30 metres.

1.6 Methodology: -

The detailed methodology adopted in this project to achieve the given objective is described in this project. Flowchart of the broad steps followed in this work for deriving statistics of land use pattern of the area is shown.



1.5 Study Area: -

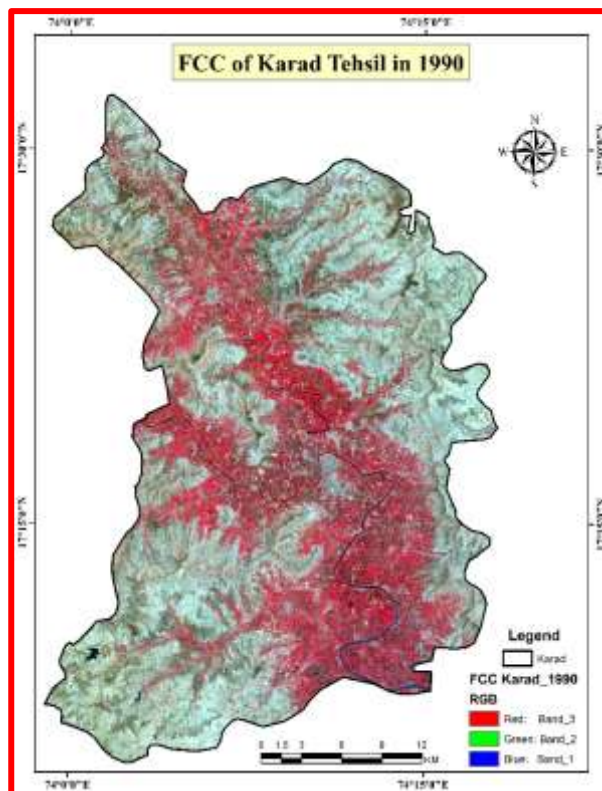
Karad is a main town in Satara district of Indian state of Maharashtra. It is located southern part of Satara District. Karad City located 302 km from Mumbai, 74 km from Sangli and 162 km from Pune. It lies at the confluence of Koyna and the Krishna River known as the "Pritisangam". These two rivers originate at Mahabaleshwar Tehsil, which is around 100 km from Karad. It is considered an important educational hub in Western Maharashtra due to the presence of many prestigious educational institutes. Karad is resting place of the first chief minister of Maharashtra Yashwantrao Chavan situated at the confluence of the Krishna and Koyana rivers. It is ranked as the cleanest town in Swachh Survekshan 2020 in the category of population with less than 1 lakh. Karad has a rich history dating back to the 17th century when it was under the control of the Maratha Empire. The city has played an essential role in the political and social history of the region.

It was an important trading center, connecting the western coast of India with the Deccan Plateau. Today, Karad is a bustling commercial centre, and the city's history can be seen in its many forts, temples, and other historical monuments.

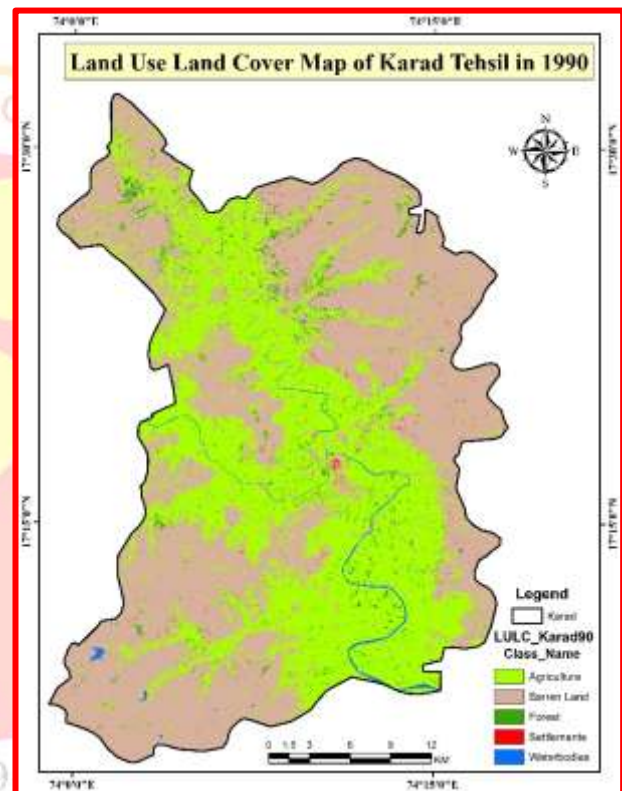
1.7 Discussion :-

Land Use Land Cover and FCC Map of Karad Tehsil in 1990

Class Name	Area (Hectors)	Area (%)
Agriculture	43086.98	41.24
Settlements	800.89	0.77
Barren Land	57493.26	55.03
Waterbodies	643.99	0.62
Forest	2459.64	2.35
Total	1044840.76	100



Map No. 2: FCC Map 1990



Map No. 3: LULC Map 1990

Interpretation: -

Agriculture: From the satellite data the agriculture area could be clearly shows in light green colour. It is Observed in Land use land Cover map of Karad Tehsil in 1990, The area of agriculture occupied by 43086.98 hectares and 41.24%.

Barren Land: In the map of LULC barren land shows in brown colour. The 57493.26 hectares or 55.03% area covered in barren land.

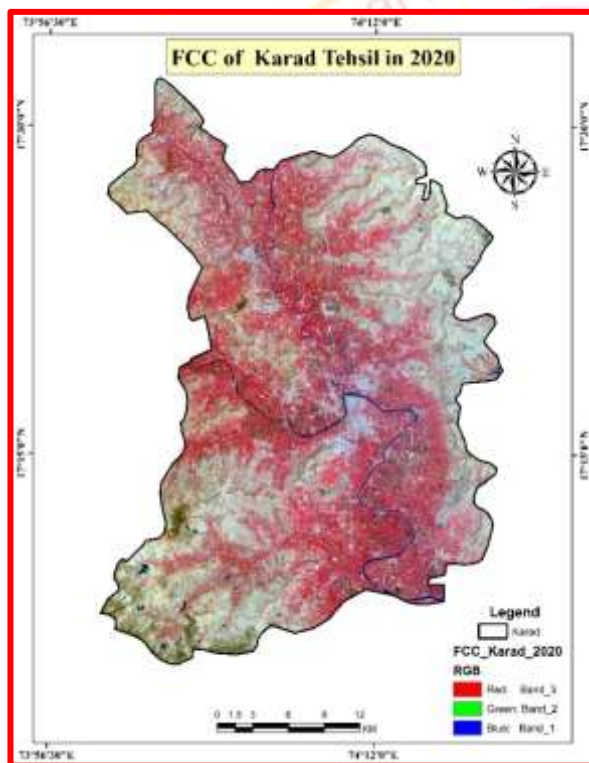
Forest: The above map smallest green pixels, shows the area of forest in green colour. The area of forest occupied by 2459.64 hectares and 2.35% respectively.

Settlement: The settlement area showed in red colour. 800.89 hectares and 0.77% area occupied by settlement.

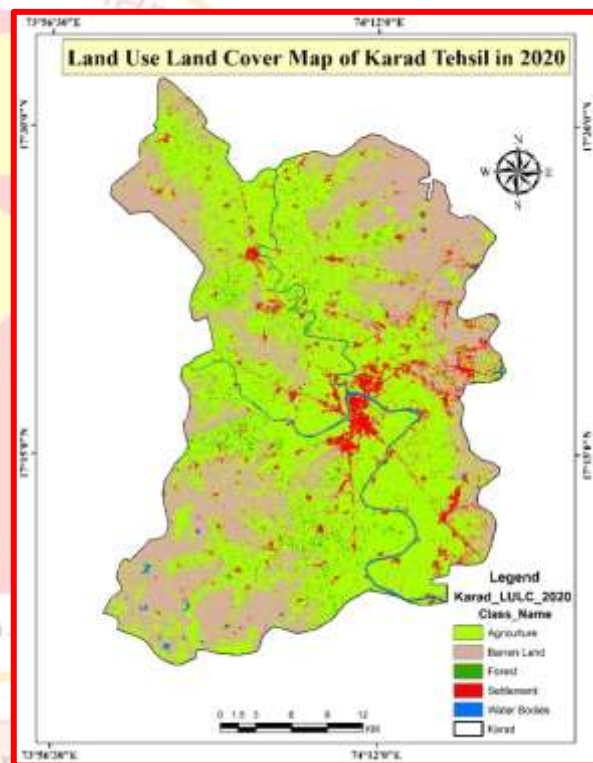
Water Bodies: This category comprises area with water either impounded in the form of pond lakes and rivers reservoirs etc. 643.99 hectares or 0.62% area occupied in water bodies.

B) Land Use Land Cover and FCC Map of Karad Tehsil in 2020

Class Name	Areas (Hectors)	Area (%)
Agriculture	58032.4	55.54
Settlement	6086.84	5.83
Barren Land	37440.2	35.83
Water Bodies	1247.91	1.19
Forest	1677.41	1.61
Total	1044840.76	100



Map No. 4: FCC Map 2020



Map No. 5: LULC Map 2020

Interpretation:

Agriculture: From the satellite data the agriculture area could be clearly visible in light green colour. Agriculture activity was practiced on a large scale in this area of Karad Tehsil. It is observed in Land use land Cover map of Karad Tehsil in 2020, the area covered by agriculture is 58032.4 hectares and 55.54%.

Baren Land: It is described as degraded land, which can be brought under vegetative cover with reasonable efforts. This area shows in brown colour. Baren land covered the area 37440.2 hectares or 35.83%.

Forest: Forest are delineated in green colour. The area of forest occupied by 1677.41 hectares and 1.61%.

Settlement: The settlement area delineated in red colour. 6086.84 hectors and 5.83% area occupied by settlement.

Water Bodies: This category comprises area with water either impounded in the form of pond lakes and rivers reservoirs etc. 1247.91 hectors or 1.19% area occupied in water bodies

1.8 Result: -

Change Detection Analysis

Class Name	Changes of Area (Hectors)	Changes Area (%)	Remark
Agriculture	14945.42	14.3	Agriculture Area Increased
Settlements	5285.95	5.06	Settlement Area Increased
Barren Land	20053.06	19.2	Barren land Area Decreased
Waterbodies	603.92	0.57	Waterbodies Area Increased
Forest	782.23	0.74	Forest Area Decreased

The land use and land cover in Karad Tehsil, Maharashtra, India, has experienced significant changes in 30 years. In this study we estimate the Spatio-Temporal changes of Land Use Land Cover of Karad Tehsil during the period of 1990 to 2020 using Remote Sensing and Geographical Information Systems Techniques. In this research I was observed that the Agricultural, Settlement and Waterbodies area increased by 14.8 %, 5.06 % and 0.57 % respectively. Barren Land and Forest area saw a decrease during the same period with 19.2 % and 0.74 % respectively. The negative change in area of Barren Land was the maximum when compared with all the classes and positive change in area of Agriculture area compared with all the classes during the period 1990-2020.

1.9 Conclusion: -

The result of the work showed that there was a rapid change of agricultural land during the period from 1990 to 2020. Therefore, it can be concluded that increase population and other human activities is reduce the area of Barren Land and Forest. The present study can useful to identify the Forest areas which are under risk due to Agriculture expansion and also Barren Land reduce due to Human Settlement.

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Crop Combination Pattern in Satara District of Maharashtra

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Abstract:

This paper explores the agricultural land use patterns of the Satara district in Maharashtra, using Doi's Method (1959) for crop combination analysis. Using tehsil-level data for the year 2015-16, this paper established a distinct spatial gradient of crop diversification, which varies from a two crop specialization in the eastern (Mahabaleshwar Tehsil) and western (Man Tehsil) periphery to a complex seven crop combination in the central fertile plains of river Krishna and its tributaries. Man and Mahabaleshwar tehsils are the least diversified, which are dominated by climate-specific staples. Man has a two crop combination of Bajara and Jowar. Similarly Mahabaleshwar has combination of Rice and Corn. On the other hand, the Karad and Satara tehsils are most diversified agricultural regions, which combine cash crops such as Sugarcane, Onion, and Tomato with traditional oilseeds. This paper establishes that irrigation infrastructure and soil type are the main determinants of crop diversification in the region.

Keywords: Crop Combination, Crop Ranking, Agriculture, Crop Cultivation; GIS Mapping, Tehsil-wise Analysis

Introduction

Agriculture is the prime economic activity in the Satara district of Maharashtra. 50.88% of the population in Satara district is engaged in agricultural activities. District has rainy and mountainous areas of the Western Ghats in the west to the semi-arid and drought-prone areas in the east. This climatic and physiographic condition leads to spatial variability in agricultural patterns. It is very essential to understand the adaptation strategies used by farmers in these different agro-climatic zones from regional planning point of view. To understand the integrated socio-economic and environmental aspects of a region crop combination analysis technique is widely used in Agricultural Geography. Single crop indicates specialization while combination of crops helps for risk-minimization in agriculture. Doi's Statistical Method (1959) is used in present study to identify the crop combination regions of Satara district. It provides a scientific framework for understanding the intensity of land use and agricultural diversification in the eleven tehsils of Satara.

Study Area

Satara District is situated in the western part of Maharashtra State, in India. District covers vital portion of the larger region of the Deccan Plateau. Satara District is located between 17°05' North to 18°11' North latitude, and between 73°33' East and 74°54' East longitude. Satara district is surrounded by Pune District to its north, Solapur District to its east, Sangli District to its south, and Ratnagiri to its west. Overall, it has a geographical area of 10,480 square kilometers. Satara District have varied types of topography, with ranges of Western Ghats (Sahyadri Mountains) in the west, hills and forests, and plateaus in the east. The district has well-developed river systems with rivers like Krishna, Koyna, Venna, Yerla, and Man, which play an important role in irrigation and development of agriculture. There are dams like Koyna, Dhoni and Kanehr, which offer irrigation services to various tehsils. The climate of the district ranges from high rainfall zones in the western hilly areas of Mahabaleshwar, Jaoli and Patan tehsil, to semi-arid conditions in the eastern tehsils of Man, Khatav, and Phaltan. The western areas receive heavy rainfall during the monsoon season, whereas the eastern areas experience minimal and uncertain rainfall. Soils throughout Satara District vary from region to region. The eastern plateau region comprises black cotton soils, whereas the western hilly region consists of lateritic and red soils. Farming is the main livelihood, with Jowar, Bajra, Rice,

Wheat, Sugarcane, Soybean, Gram, and Groundnut forming the core crops. Varied topography, unequal distribution of rainfall, different soil types, and variation in irrigation potentialities in Satara district results in spatial diversity in crop patterns.

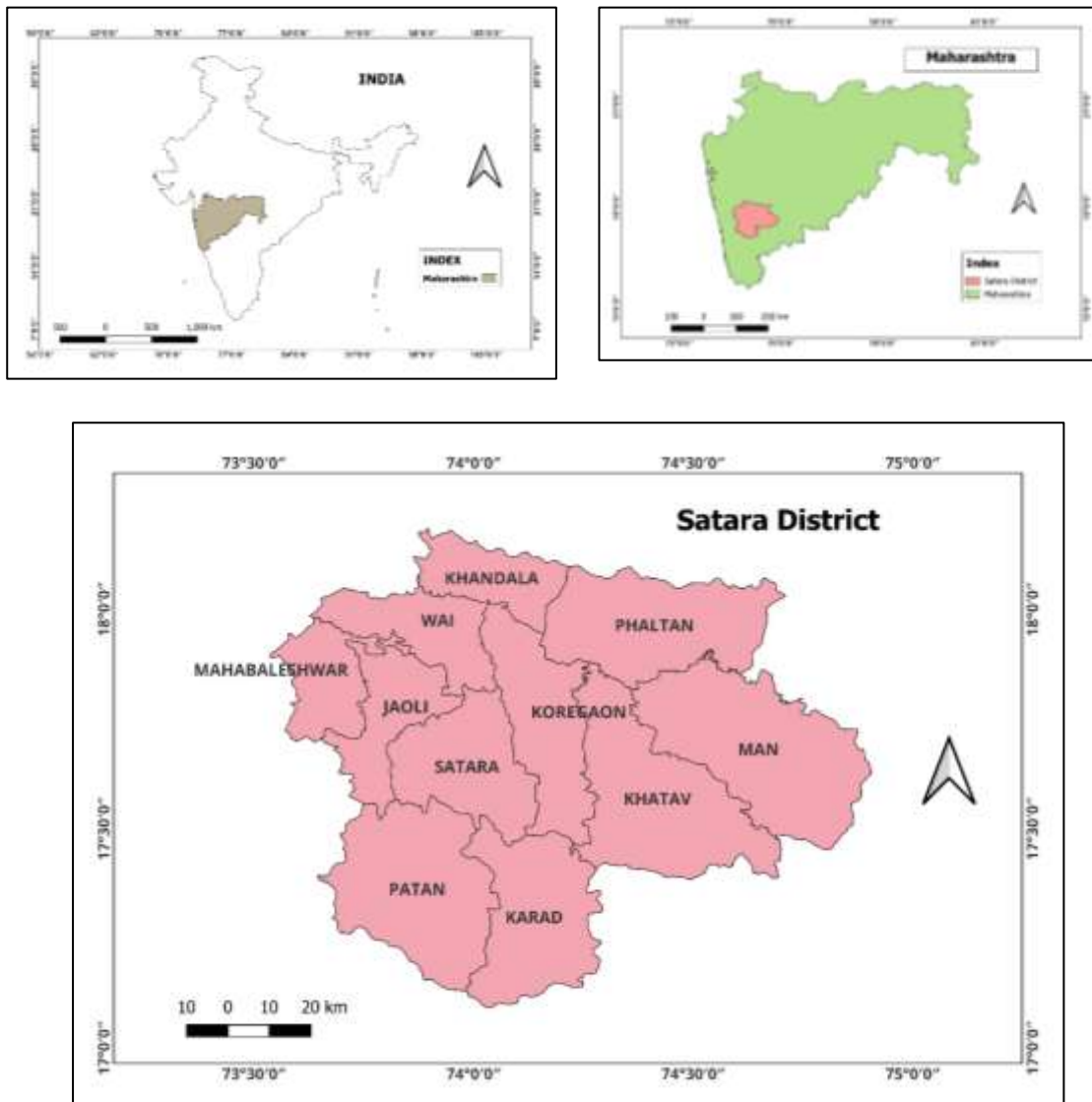


Fig. No.1: Location Map of Study Area

Objectives:

1. To identify and rank the major crops grown in different tehsils of the Satara District.
2. To identify crop combination regions in Satara District.

Methodology:

The present study utilizes the crop combination method developed by Doi (1959). This technique is an improvement over Weaver's (1954) method. Doi simplified the process by introducing a Critical Value Table to identify crop combination.

Data Processing and Ranking

The primary data for the year 2015-16 is collected from the Socio-Economic Abstract of Satara District. The area under each crop is converted into a percentage of the total gross cropped area of the tehsil. Crops are arranged in descending order based on their percentage share to find out ranking of various crops. Doi's method seeks to find the combination where the sum of squared differences is the lowest. However, the actual application involves checking the cumulative percentage of ranked crops against Doi's One-Sheet

Table of Critical Values. If that crop's percentage is higher than the critical value found in Doi's table (based on the sum of the percentages of the preceding crops), that crop is included in the combination.

First Rank Crop

Table No. 1: First Rank Crop in Satara District			
Tehsil	Crop	Area (Hector)	Percentage Share of Cropped Area
Mahabaleshwar	Rice	7660	39.91
Wai	Jowar	10106	24.58
Khandala	Jowar	14720	33.09
Phaltan	Jowar	22998	36.64
Man	Bajara	64762	56.64
Khatav	Bajara	33286	27.91
Koregoan	Jowar	25682	25.30
Satara	Soyabean	19967	26.02
Jaoli	Jowar	12142	33.14
Patan	Corn	12256	17.03
Karad	Sugarcane	37111	32.28

Source: Computed by Researcher

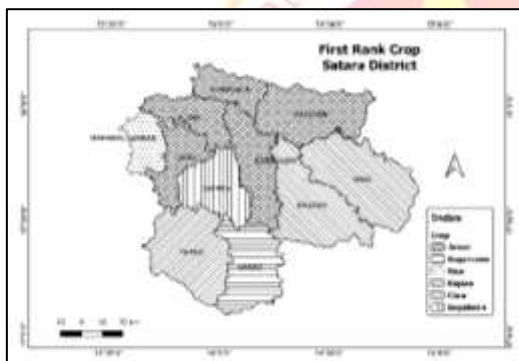


Fig. No. 2



Fig. No. 3



Fig. No. 4



Fig. No. 5

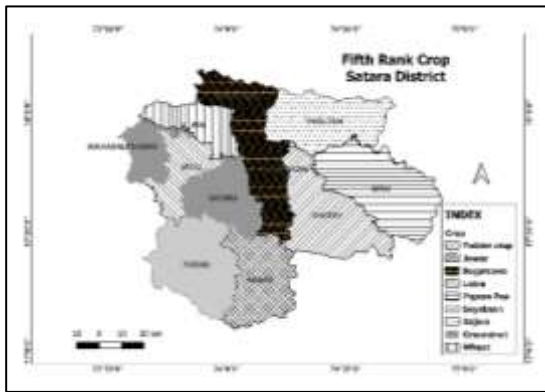


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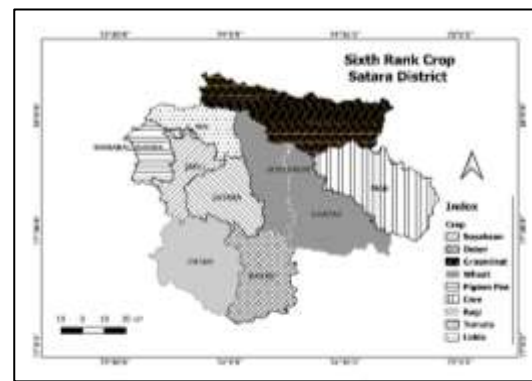


Fig. No. 7

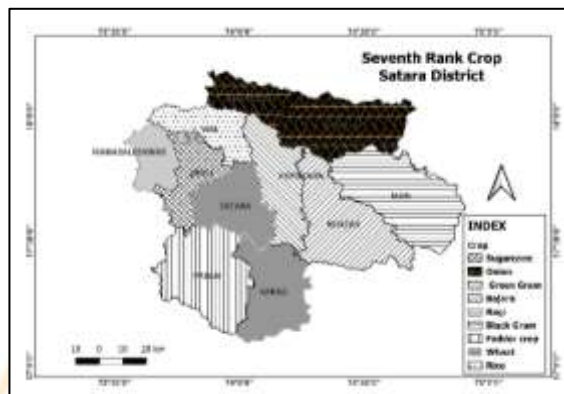


Fig. No. 8

The Fig. No. 2 shows the first-rank crops in each tehsil of Satara district based on their percentage share of cropped area. Jowar is ranking first in Wai, Khandala, Phaltan, Koregaon, and Jaoli tehsils. Bajara shows strong dominance in Man (56.64%) and Khatav tehsils, indicating specialization in drought-prone areas. Rice rank first in Mahabaleshwar tehsil due to high rainfall conditions. Commercial crop Soyabean rank first in Satara, Corn in Patan, and Sugarcane in Karad tehsils. Dominance of commercial crop reflects better irrigation and favorable agricultural infrastructure. Overall, the pattern shows that rainfall and irrigation availability have strongly direct influence on crop dominance across the district.

Table No. 2: Second Rank Crop in Satara District

Tehsil	Crop	Area (Hector)	Percentage Share of Cropped Area
Mahabaleshwar	Corn	5860	30.54
Wai	Soyabean	7380	17.95
Khandala	Gram	13098	29.44
Phaltan	Wheat	12452	19.84
Man	Jowar	21339	18.66
Khatav	Jowar	28992	24.31
Koregaon	Lobia	22514	22.18
Satara	Jowar	11946	15.57
Jaoli	Rice	8441	23.04
Patan	Rice	11629	16.16
Karad	Fodder crops	15497	13.48

Source: Computed by Researcher

The Fig. No. 3 shows the second-rank crops in different tehsils of Satara district. Corn is the second major crop in Mahabaleshwar tehsil (30.54%), while Soyabean ranks second in Wai tehsil. Gram in Khandala tehsil (29.44%) and Wheat in Phaltan tehsil (19.84%) indicate diversification towards pulses and food grains. In the drought-prone tehsils of Man and Khatav, Jowar appears as the second-rank crop, which is suitable for dry farming. Rice ranks second in Jaoli and Patan tehsils, due to favorable rainfall conditions. In Koregaon, Lobia holds the second position, which indicates importance pulse cultivation. Satara shows Jowar as the second ranking crop, while Karad has fodder crops in the second rank, indicating the influence of dairy and sugarcane-based agriculture. Overall, the second-rank pattern reflects crop diversification based on rainfall, soil type, and irrigation availability across the district.

Table No. 3: Third Rank Crop in Satara District

Tehsil	Crop	Area (Hector)	Percentage Share of Cropped Area
Mahabaleshwar	Gram	1986	10.35
Wai	Sugarcane	4809	11.70
Khandala	Bajara	9065	20.38
Phaltan	Sugarcane	5767	9.19
Man	Gram	8962	7.84
Khatav	Soyabean	14878	12.47
Koregaon	Soyabean	19516	19.23
Satara	Sugarcane	11305	14.73
Jaoli	Corn	3315	9.05
Patan	Jowar	11392	15.83
Karad	Soyabean	13768	11.98

Source: Computed by Researcher

The Fig. No. 4 shows the third-rank crops in various tehsils of Satara district, indicating further crop diversification. Gram is third ranking crop in Mahabaleshwar and Man tehsils. It shows the role of pulses in both high rainfall and semi-arid areas. Sugarcane ranks third in Wai, Phaltan, and Satara tehsils, reflecting expansion of irrigation facilities and commercial agriculture. Bajara rank third in Khandala tehsil (20.38%) and Jowar in Patan tehsil (15.83%) which indicates the importance of coarse cereals. Soyabean occupies the third rank in Khatav, Koregaon, and Karad tehsils, shows growing importance of Soyabean as a cash crop. In Jaoli tehsil, Corn holds the third position. Overall, the third-rank crops include mix of cereals, pulses, and commercial crops influenced by agro-climatic and irrigation conditions.

Table No. 4: Fourth Rank Crop in Satara District

Tehsil	Crop	Area (Hector)	Percentage Share of Cropped Area
Mahabaleshwar	Bajara	1079	5.62
Wai	Ground nut	4809	11.70
Khandala	Wheat	2929	6.58
Phaltan	Gram	4307	6.86
Man	Wheat	8936	7.82
Khatav	Gram	9283	7.78
Koregaon	Groundnut	14134	13.93
Satara	Rice	5822	7.59
Jaoli	Groundnut	2876	7.85
Patan	Groundnut	9173	12.74
Karad	Groundnut	13111	11.40

Source: Computed by Researcher

The Fig. No. 5 presents the fourth-rank crops in different tehsils of Satara district. Groundnut appears prominently as the fourth-rank crop in Wai, Koregaon, Jaoli, Patan, and Karad tehsils. It shows its importance as an oilseed crop. Gram rank fourth in Phaltan and Khatav tehsils and Wheat rank fourth in Man, and Khandala tehsils. It reflects role of food grains and pulses in semi-arid regions of Satara district. In Mahabaleshwar, Bajara ranks fourth. In Satara tehsil Rice is the fourth ranking crop. Overall, the fourth-rank crops show increasing area under cereals, pulses, and oilseeds.

Table No. 5: Fifth Rank Crop in Satara District			
Tehsil	Crop	Area (Hector)	Percentage Share of Cropped Area
Mahabaleshwar	Groundnut	682	3.55
Wai	Wheat	3606	8.77
Khandala	Sugarcane	1021	2.30
Phaltan	Bajara	4256	6.78
Man	Pigeon Pea (Tur)	2220	1.94
Khatav	Lobia	8460	7.09
Koregaon	Sugarcane	6956	6.85
Satara	Groundnut	5648	7.36
Jaoli	Fodder crops	1767	4.82
Patan	Soyabean	6571	9.13
Karad	Jowar	11046	9.61

Source: Computed by Researcher

The Fig. No. 6 shows the fifth-rank crops in various tehsils of Satara district. Groundnut appears as the fifth rank crop in Mahabaleshwar and Satara tehsils, while Wheat ranks fifth in Wai tehsil. Sugarcane has the fifth rank in Khandala and Koregaon tehsils, reflecting limited presence of irrigation facilities. Bajara in Phaltan tehsil and Jowar in Karad tehsil indicate the role of coarse cereals at lower ranks. In Man tehsil, Pigeon Pea (Tur) appears with a very small share (1.94%). Lobia in Khatav tehsil and Soyabean in Patan tehsil rank fifth. Jaoli shows fodder crops in the fifth rank, suggesting the role of livestock-based agriculture. Overall, the fifth-rank crops cereals, pulses, oilseeds, and commercial crops contribute in smaller proportions across the district.

Table No. 6: Sixth Rank Crop in Satara District			
Tehsil	Crop	Area (Hector)	Percentage Share of Cropped Area
Mahabaleshwar	Pigeon pea (Tur)	551	2.87
Wai	Lobia	2384	5.80
Khandala	Groundnut	983	2.21
Phaltan	Groundnut	3942	6.28
Man	Corn	1536	1.34
Khatav	Wheat	5487	4.60
Koregaon	Wheat	4526	4.46
Satara	Tomato	5043	6.57
Jaoli	Soyabean	1659	4.53
Patan	Ragi (Nachani)	4738	6.58
Karad	Onion	10861	9.45

Source: Computed by Researcher

The Fig. No. 7 shows sixth rank crops in the tahsils of Satara District. These crops occupy relatively smaller proportions of the gross cropped area. Their percentage share varies from 1.34% to 9.45%.

The lowest share is found in Man tehsil (corn: 1.34%), while the highest share is found in Karad (onion: 9.45%).

Table No. 7: Seventh Rank Crop in Satara District

Tehsil	Crop	Area (Hector)	Percentage Share of Cropped Area
Mahabaleshwar	Ragi (<i>Nachani</i>)	485	2.53
Wai	Rice	1803	4.38
Khandala	Onion	705	1.58
Phaltan	Onion	1992	3.17
Man	Black Gram (<i>Udid</i>)	1325	1.16
Khatav	Green Gram (<i>Mung</i>)	4110	3.45
Koregoan	Bajara	4176	4.11
Satara	Wheat	5013	6.53
Jaoli	Sugarcane	1378	3.76
Patan	Fodder crops	2269	3.15
Karad	Wheat	3805	3.31

Source: Computed by Researcher

The spatial distribution of seventh rank crops in the tehsils of Satara District is shown in the Fig. No. 8. Seventh rank crops have relatively smaller proportion of the total cropped area. Their proportion varies from 1.15% to 6.53%. Wheat (6.53%) is seventh-ranked crop in Satara tahsil. Minimum share of seventh-ranked crop is found in Man tehsil (Black Gram: 1.15%). Onion is the seventh-ranked crop in Khandala (1.58%) and Phaltan tehsils (3.17%). Sugarcane in Jaoli (3.76%) is at seventh rank. Fodder crops in Patan (3.15%), Green Gram (*Mung*) in Khatav (3.45%), udid in Man, Rice (4.38%) in Wai, Bajara (4.11%) in Koregaon, Ragi (*Nachani*) (2.53%) in Mahabaleshwar, Wheat (3.31%) in Karad is at seventh rank. The seventh rank crop pattern shows moderate but organized diversification in Satara District.

Crop Combination Region:

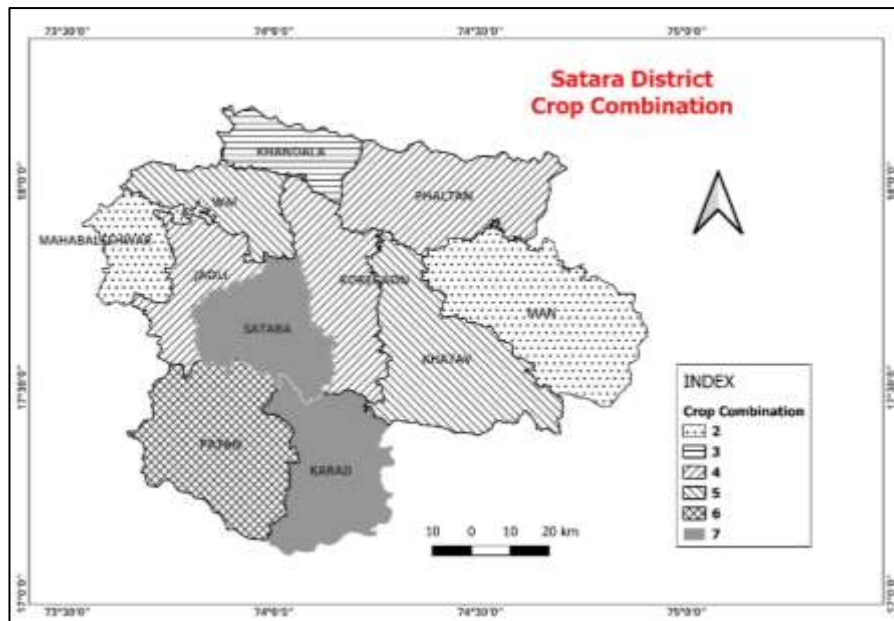
Analysis of crop combination shows large variations in agricultural practices in different tehsils of Satara district. The number of crops in each crop combination represents the level of crop diversification and agricultural intensity.

Table No. 8: Crop Combination in Satara District

Tahsil	Combination	Crops
Man	2	Bajara, Jowar
Mahabaleshwar	2	Rice, Corn
Khandala	3	Jowar, Gram, Bajara
Phaltan	4	Jowar, Wheat, Sugarcane, Gram
Jaoli	4	Jowar, Rice, Corn, Ground nut
Koregaon	4	Jowar, Lobia, Soyabean, Groundnut
Khatav	5	Bajara, Jowar, Soyabean, Gram, Lobia
Wai	5	Jowar, Soyabean, Sugarcane, Groundnut, Wheat
Patan	6	Corn, Rice, Jowar, Groundnut, Soyabean, Ragi (<i>Nachani</i>)
Satara	7	Soyabean, Jowar, Sugarcane, Rice, Groundnut, Tomato, Wheat
Karad	7	Sugarcane, Fodder crops, Soyabean, Groundnut, Jowar, Onion

Source: Computed by Researcher

Fig. No. 9: Crop Combination in Satara District



The analysis of crop combination patterns at the tehsil level reveals significant spatial variation in agricultural diversification across the district. The number of crops included in each combination ranges from two to seven. This variation is mainly because of differences in physical conditions, irrigation availability, and agricultural development.

1. Low Crop Combination (2 Crops Combination)

Man and Mahabaleshwar show two-crop combinations. In Man Tehsil Bajara and Jowar are dominant crops. This is the indication of semi-arid climatic conditions, low rainfall, and inadequate irrigation facilities in Man Tehsil. In Mahabaleshwar Tehsil Rice and Corn are dominant crops. High rainfall, hilly terrain, and climatic conditions in Mahabaleshwar tehsil are suitable for Rice and Corn. This type of combination shows relative specialization and lack of diversification.

2. Moderate Crop Combination (3-4 Crops)

Khandala (3 crops), and Phaltan, Jaoli, Koregaon (4 crops) exhibit moderate diversification.

Khandala: Area under Jowar, Gram, and Bajara indicate a mixed dry farming practice in Khandala Tehsil.

Phaltan: Jowar, Wheat, Sugarcane, Gram are dominant crops in Phaltan tehsil. Area under Sugarcane and Wheat indicates better irrigation facilities in tehsil.

Jaoli: Rice and Groundnut along with Jowar and Corn indicate transitional agro-climatic conditions.

Koregaon: A combination of food grains (Jowar, Lobia,) and oilseeds (Soyabean, Groundnut) indicates balanced agriculture.

These tehsils indicate a transition from subsistence to semi-commercial agriculture.

3. High Crop Combination (5 Crops)

Khatav and Wai tehsils are classified as five-crop combination areas. There is enhanced diversification in cereals, pulses, oilseeds, and commercial crops. Moderate irrigation facilities and better agricultural practices in these tehsils are responsible for the diversity in crops. The presence of Sugarcane and Soyabean marks commercialization of agriculture in these tehsils.

4. Very High Crop Combination (6-7 Crops)

Patan (6 crops), and Satara & Karad (7 crops) have the highest level of crop diversification.

Patan: Addition of Ragi (Nachani) along with Corn, Jowar, Rice and Oilseeds indicate diverse topography and rainfall patterns.

Satara: Addition of Tomato and other commercial crops with cereals indicates market-oriented agriculture and improved infrastructure.

Karad: Dominance of Sugarcane, Fodder crops, and Onion indicate high irrigation intensity and developed agro-economy.

These tehsils represents agricultural progress and high diversification mainly because of well-developed irrigation systems, market links and favourable physiographic and climatic conditions.

There is a clear gradient of crop diversification from eastern dry tehsils (like Man) to western and irrigated tehsils (like Karad and Satara). Semi-arid regions (like Man) show crop specialization, mainly in drought-resistant cereals. Irrigated and high rainfall regions (like Karad and Satara) exhibit diversified and commercialized cropping patterns. The number of crops in combination increases with improved irrigation, soil fertility, Climatic condition and market accessibility.

Conclusion

The study of crop patterns in the Satara district highlights the significant role of physiography and irrigation in shaping agricultural practices in the region. By using Doi's statistical method, the following conclusions can be drawn:

- 1) The low-diversification areas (2-3 crops) in Man, Khandala and Mahabaleshwar tehsils are immediately associated with environmental constraints, such as drought-prone areas in the eastern part and excess rainfall in the western part.
- 2) The moderate-diversification areas (4-5 crops) includes Phaltan, Jaoli, Koregaon, Khatav and Wai tehsils represent a major transition from subsistence to commercial oilseed and pulse production.
- 3) The high-diversification areas (6-7 crops) includes Patan, Karad and Satara tehsils represent the maximum exploitation of the water resources, enabling a combination of fodder, vegetables, and high-quality cash crops.
- 4) To improve agricultural sustainability, future policy measures should aim at raising the crop combination index in the eastern scarcity areas through better water resource management and the introduction of drought-tolerant commercial crop varieties.

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Recent Advancements in Geographical Research

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Abstract:

Geographical studies have undergone significant developments in recent times, offering new and exciting avenues for exploration. The proceeding of the International Seminar on "Recent Advancement in Geographical Research offers a comprehensive exploration of the latest developments in the field of geography. These proceedings encompass a wide spectrum of topics, insights, and methodologies from both physical and human geography, demonstrating the multidimensional nature of the field. Recent advancements in geographical research are heavily driven by the integration of AI, machine learning, and advanced geospatial technologies to analyze complex environmental and human patterns. Key trends include GeoAI, high-resolution remote sensing, 3D mapping, and digital twins for urban resilience, significantly improving data interpretation in physical and human geography.

Keywords: GeoAI, Remote Sensing,

Introduction:

Recent Advancements in Physical Geography, deals with the evolving landscape of physical geography, emphasizing technological and scientific advancements. Notable chapters include research on environmental degradation assessment, sustainable agriculture through geospatial analysis, groundwater potential mapping, innovation management in natural risk prevention, and the analysis of land use and land cover changes. Cutting-edge techniques and technologies, such as remote sensing and machine learning, underpin these investigations. Human Geography focuses on human geography, exploring the intricate relationships between human societies and their environments. Chapters encompass a wide array of topics, including migration's impact on agriculture, household food security, and urbanization's effect on wetland ecosystems, the dynamics of urban growth, and sustainable tourism and destination loyalty. These investigations reveal the social, economic, and cultural dimensions of geography and provide insights into contemporary challenges and opportunities in the field.

Technological Advancements in Data & Analysis:

Integrating geospatial data and data mining is revolutionizing urban planning, environmental monitoring, and infrastructure development. The model-based workflows connect digital environments, including Building Information Modeling and digital twins, and transform infrastructure projects by enabling more precise and collaborative workflows. Advanced data collection methods, such as 3D scanners and mobile mapping systems, are improving the accuracy and comprehensiveness of reality capture. Furthermore, articles that evaluate livable cities and urban resilience through GIS provide valuable insights for sustainable development. Incorporating GPT, large language models, and generative artificial intelligence models in geospatial science opens new data analysis and decision-making methods.

- **GeoAI and Machine Learning:** Artificial intelligence is used to accelerate spatial analysis, allowing for automated data interpretation, pattern discovery, and predictive modeling.
- **Remote Sensing (RS) and LiDAR:** Advances include improved spatial resolution and specialized, active sensors (e.g., LiDAR) for 3D mapping of topography, bathymetry, and urban structures.
- **Digital Twins and Cloud GIS:** The development of 3D, real-time digital twins allows for modeling urban environments, infrastructure projects, and environmental systems, fostering deeper connections between physical and digital worlds.

Physical Geography and Environmental Research:

- **Environmental Modeling:** Research focuses on assessing environmental degradation, monitoring biodiversity loss, and climate change impacts.
- **Groundwater and Hazard Mapping:** Advanced techniques are applied to map groundwater potential, analyze land use changes, and evaluate risks from natural disasters.
- **Sustainable Agriculture:** Geospatial analysis and remote sensing are utilized to enhance agricultural sustainability and manage natural resources.

Human and Urban Geography:

- **Urban Resilience and Livable Cities:** GIS is employed to analyze urban growth patterns, heat islands, and green space fragmentation, assisting in sustainable urban planning.
- **Socio-Economic Analysis:** Studies explore the interaction between human societies and their environments, including, for example, gender-related geographic appraisals, such as women's electoral participation.
- **Methodological Shifts:** There is an increasing emphasis on using Big Data and real-time location data for social, economic, and cultural studies.

These advancements facilitate more precise, data-driven solutions to global challenges, shifting from traditional methodologies toward integrated, high-tech, and interdisciplinary approaches.

Potential challenges and future directions:

The key insights are:

1. Spatiotemporal data models possess limited capacity for managing the virtual–real alignment of all geographical entities; therefore, an integrated and intelligent data model is required to replicate all geographical entities and realize virtual–real interactions within geospatial digital twins;
2. Twinning technologies that fail to consider dynamic behaviour constrain geographical scenario simulations; consequently, a geographical process twinning technology is expected to become a prominent research;
3. A collaborative visualization scheme offers an optimal solution for addressing multimodal data, multi-user operations, and scenario simulations;
4. An integration strategy combining geospatial twin frameworks with geospatial artificial intelligence (GeoAI) models will become another prospective research. These findings contribute to understand the foundational theories and key technologies of geospatial digital twins, further promote its development.

Conclusions:

The research status, challenges, and prospective trends concerning the four key issues within this framework were systematically assessed. The primary conclusions drawn are as follows.

The challenges of describing, representing, organizing and storing geographical twinning objects are to deal with the issues of multi-spatiotemporal scale, the integration of geographical statics and dynamics, and the interaction between virtual and reality. To address this issue, a more systematic and integrated spatiotemporal data model is a prospective direction, which not only address the modelling of geographical objects and their interrelations but also capture the capabilities of dynamic evolution and self-updating among these objects.

A geographical process, coupling geographical objects and the driving mechanisms behind their evolution, plays a foundation on decision-supports and 'what-if' scenario simulations, thus the great challenge in twinning geographical process is to design a high-fidelity mapping model to replicate geographical entities and their evolutionary mechanisms from a physical space to a digital one. A potential

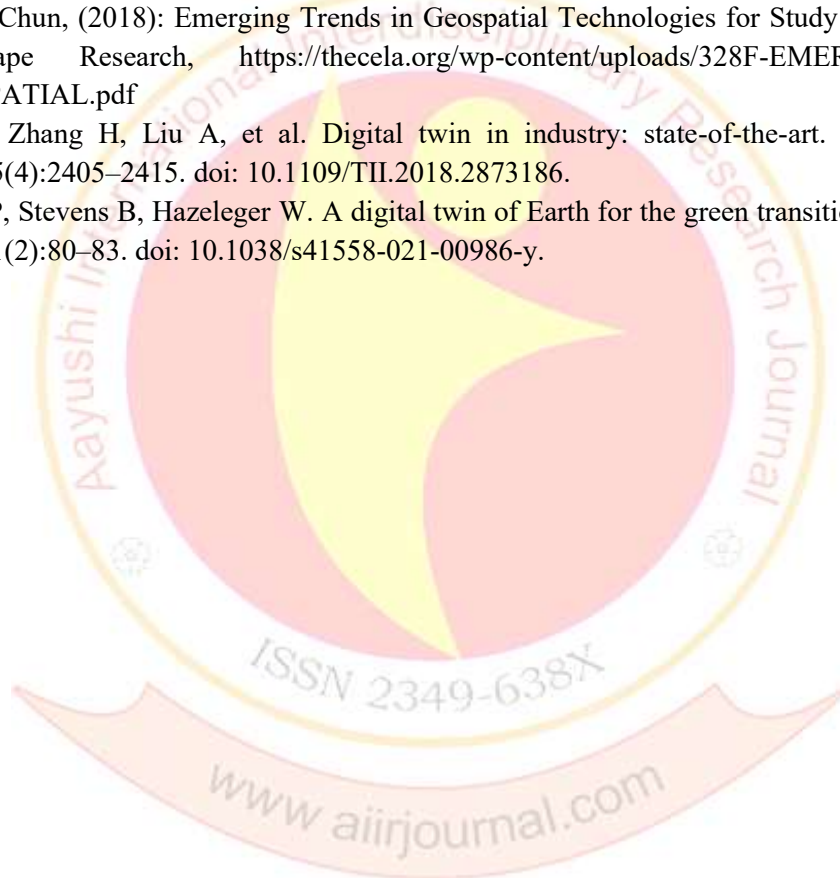
solution is to integrate the parameterized physical models with deep learning models to construct interpretable geographical process twinning technologies that adhere to physical laws.

The intrinsic characteristics of geospatial twins necessitate the integrated visualization of geographical multimodal data, the collaborative visualization of twin scenarios, and the interactive visualization of twin scenarios. Considering these challenges, geographical visualization technologies of geospatial twins are evolving in a more comprehensive and integrated manner.

Within the geographical twin framework, an ideal information system should integrate emerging technologies that leverage the computational power of GeoAI while enhancing their physical interpretability, which will promote the benefits of scenario simulation in twin spaces, such as flexible parameter input and real-time simulation result evaluation.

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Occupational Structure and Occupational Distribution: A Study of Lohar Community in Satara District of Maharashtra

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Abstract

*The Lohar community in Satara district, Maharashtra, has historically served as a vital pillar of the rural **Baluta system**, traditionally responsible for manufacturing and repairing essential agricultural implements and household items. This research paper examines the contemporary occupational structure of this community, highlighting a significant transition from hereditary craftsmanship to diversified livelihoods. Modern agricultural mechanization has significantly diminished the demand for traditional hand-forged tools, impacting the Lohar community in centres like Phaltan, Karad and Satara. While their workshops persist, blacksmithing is no longer a sustainable primary income source, forcing a shift toward cultivation, agricultural labour, and industrial or service roles in urban areas. This transition is often hindered by a lack of capital and limited access to technical education, which restricts upward mobility. Categorized under OBC in India and NT-B in Maharashtra, subgroups like the nomadic Gadia Lohars face even greater challenges due to persistent landlessness.*

Keywords: Lohar Community, Occupational Structure, Baluta Systems etc.

Introduction:

Traditionally, the Lohar community has served as the vital artisanal foundation of Satara's rural economy, acting as the primary craftsmen for essential farming implements like ploughshares and sickles. Historically integrated into the Baluta system, they were compensated for their expertise with a portion of the seasonal harvest, solidifying their role as indispensable partners in the agrarian cycle. Today, while officially recognized under OBC and NT-B classifications in Maharashtra, their significance remains rooted in this deep historical connection to ironwork, which defines both their social standing and their enduring contribution to the district's agricultural identity. The Lohar community's traditional work is rapidly changing due to technology, farming methods, and migration of community specifically youngsters in search of jobs in cities. Factory-made iron tools and plastic items have largely replaced handmade goods. In areas like Karad, Wai, and Phaltan, the switch to tractors has also lowered the need for manual tool upkeep. Consequently, younger people are moving to cities such as Satara and Pune to work in industry, private services, or modern manufacturing.

Study Area:

Satara district is the most important region of the western Maharashtra and Deccan plateau region. The Satara district is located in the western Indian state of Maharashtra spread across an area of almost 10484 square kilometres, which is bordered by Solapur to the east, Ratnagiri to the west, Pune to the north and Sangli to the south. The location of Satara District clearly shows that; the Rivers Krishna and Koyna provide opportunities for agricultural practices. Satara, Panchgani, Mahabaleshwar, Karad, Wai, Koregaon and, Koyananagar are the chief towns of Satara District provides agricultural markets in the region.

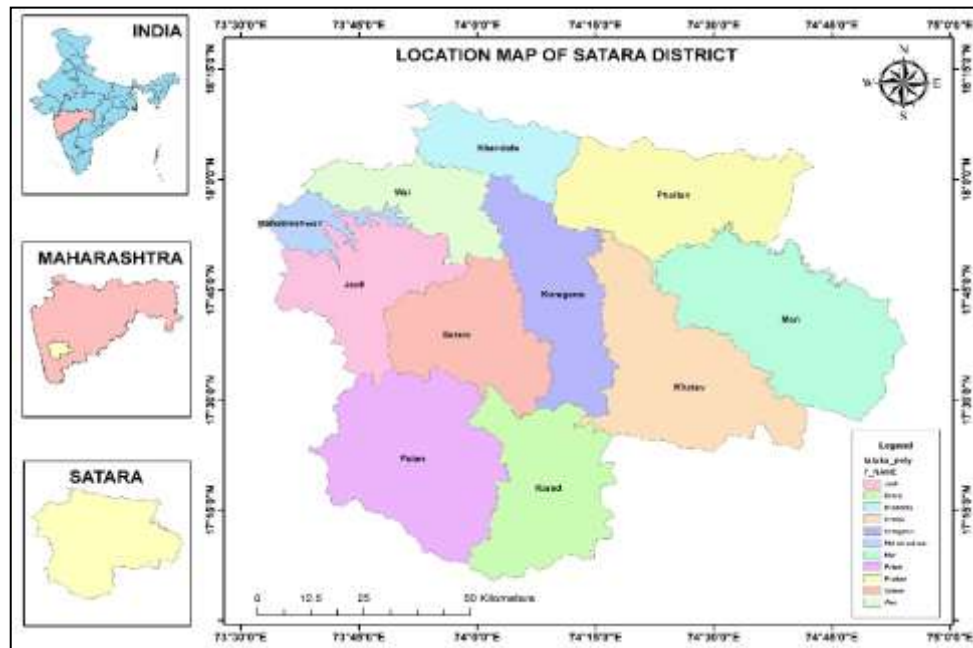


Fig. Location Map of the Study Area

The region extends between 17° 5' North to 18° 11' North latitude and 73° 33' East to 74° 54' East longitude. Administratively the district has divided in to 11 tahsils, namely Satara, Karad, Wai, Mahabaleshwar, Phaltan, Man, Khatav, Koregaon, Patan, Jaoli, and Khandala respectively.

Research Objective:

1. To Study the occupational structure of Lohar Community in the study region.
2. To analyse present occupational distribution of the Lohar community in Satara District.
3. To understand the factors responsible for occupational change, in the region.

Data Base And Methodology:

Primary data pertaining to the occupational structure of Lohar Community and its distribution in Satara district has been collected through intensive field work by using schedule for conducting personal interviews with the people of Lohar Community of the study area. The secondary data concern with the Lohar Community is not available.

In order to fulfil the objectives of the study, multistage sampling method was adopted in the selection of villages. Initially, Satara district was purposively selected for the study of Lohar community in Maharashtra. In second stage, all eleven tahsils namely Mahabaleshwar, Wai, Khandala, Phaltan, Man, Khatav, Koregaon, Satara, Jawali, Patan and Karad and all circles were selected. In third stage, out of the total villages, only villages having Lohar community from each circle were selected. In last stage of sampling design, only 25% (254) villages, out of the total villages having Lohar community (1017) were selected purposively on the basis of maximum number of families from selected sample villages. Totally 1909 number of families was selected for the present study.

The percentage has been taken into account to assess the occupational structure of Lohar community in Satara district.

Results And Discussion:

A. Occupational Structure And Occupational Distribution:

The Table No.1 shows that, based on the demographic data of the Lohar community in the Satara district, we can categorize their regional presence into three distinct levels of population. This distribution highlights where the community is most concentrated and where its presence is more scattered.

1.High Proportion: The Satara Tehsil serves as the central anchor for the community, housing more than one-fifth of the total population. This high density is likely due to Satara's status as the district's administrative and economic heart. The concentration here suggests that the community is gravitating toward the centre of the district, likely seeking the benefits of urbanization, such as better access to healthcare, higher education, and a more diverse job market.

Table No. 1 Occupational Structure and Distribution of Lohar Community in Satara District (in %)

Sr. No.	Tehsil	Lohar Work	Labour	Cultivators	Business	Services		Total Lohar Population Proportion
						Govt.	Private	
1	Mahabaleshwar	33.3	27.8	11.1	2.8	0.0	25.0	1.57
2	Wai	50.3	29.2	8.1	3.1	2.5	6.8	7.04
3	Khandala	33.3	29.2	11.1	6.9	8.3	11.1	3.15
4	Phaltan	35.3	27.5	8.9	6.2	5.8	16.3	11.28
5	Man	33.8	36.4	6.0	4.6	6.6	12.6	6.60
6	Khatav	37.5	40.5	9.0	3.0	3.5	6.5	8.75
7	Koregaon	24.7	39.4	12.9	5.3	6.5	11.2	7.43
8	Satara	19.7	31.2	9.4	9.0	9.2	21.4	20.86
9	Jawali	36.6	38.6	5.0	4.0	3.0	12.9	4.42
10	Patan	28.4	43.8	3.1	3.4	3.8	17.5	13.99
11	Karad	21.7	37.5	7.0	6.5	8.5	18.8	14.91
	District	29.4	35.3	7.9	5.6	6.2	15.6	100.00

Source: Data Compiled and Computed by the Researcher based on Primary survey conducted during 2023-2024.

2.Moderate Proportion: A substantial portion of the community is found in Karad, Patan, and Phaltan. These tehsils represent the "secondary strongholds" of the Lohar population. With population shares between 10% and 20%, these areas show a well-established community footprint. These regions are often characterized by a mix of semi-urban development and strong agricultural activity, providing a stable environment where the community can balance traditional roles with new economic opportunities.

3.Low Proportion: The majority of the tehsils in the district including Khatav, Koregaon, Wai, Man, Jawali, Khandala, and Mahabaleshwar show a relatively low population density for the community. In these areas, the Lohar community exists in smaller, more fragmented groups. While some of these tehsils, like Wai, show a very high adherence to traditional work (as seen in previous data), they do not have a large number of community members. In hilly or more remote regions like Mahabaleshwar and Jawali, the low numbers suggest that the community may have migrated outward or that the local geography does not support large-scale traditional blacksmithing or industrial labour.

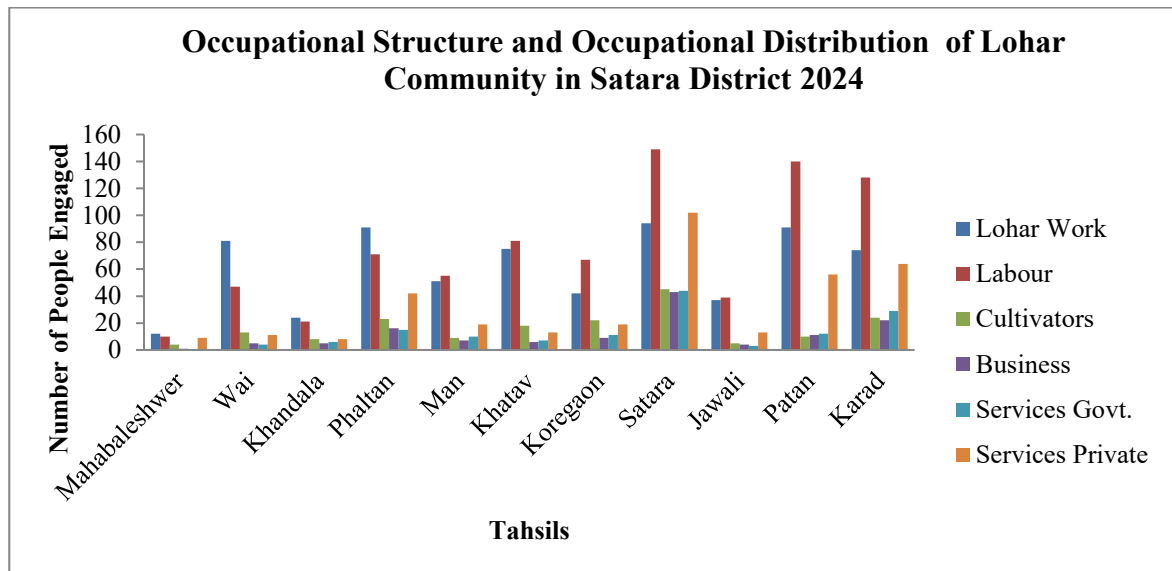


Fig.No.1 Data Compiled and Computed by the Researcher based on Primary survey conducted during 2023-2024.

The Table No.1 shows that, highest numbers of peoples of the community are working as Labour followed by Lohar work, Services in private sectors, Cultivators, Services in Government Sectors and business respectively. According to recent data, labour accounts for approximately 35.3% of the workforce (808 individuals), surpassing traditional blacksmithing. While Lohar work remains a vital part of their identity, it has moved to the second-largest category, employing roughly 29.4% (672 individuals) of the community. This transition highlights a move away from specialized artisanal work toward more versatile, though often less secure, manual employment. (See Fig.No.1)

Economic activity is heavily concentrated in the major hubs of Satara, Karad, and Patan, which serve as the primary employment centres for the district. Beyond manual labour and smithing, the community has diversified into sectors as under. Private Services: Employs about 15.6% (356 workers), reflecting growing integration into the modern service economy. Cultivation: Approximately 7.9% (181 workers) remain engaged in direct farming. Government Services & Business: These remain the smallest sectors, representing 6.2% and 5.6% respectively, suggesting that barriers to high-level government employment and capital-intensive entrepreneurship still persist.

The Lohar community in Satara is in a state of economic transition. While the traditional craft remains a pillar in Tehsils like Wai, there is a clear trend toward proletarianization (moving into labour) and professionalization (moving into services). The high percentage of "Labour" across the district (35.3%) suggests a need for skill development programs to help the community transition from low-skill labour into high-skill technical trades or entrepreneurship.

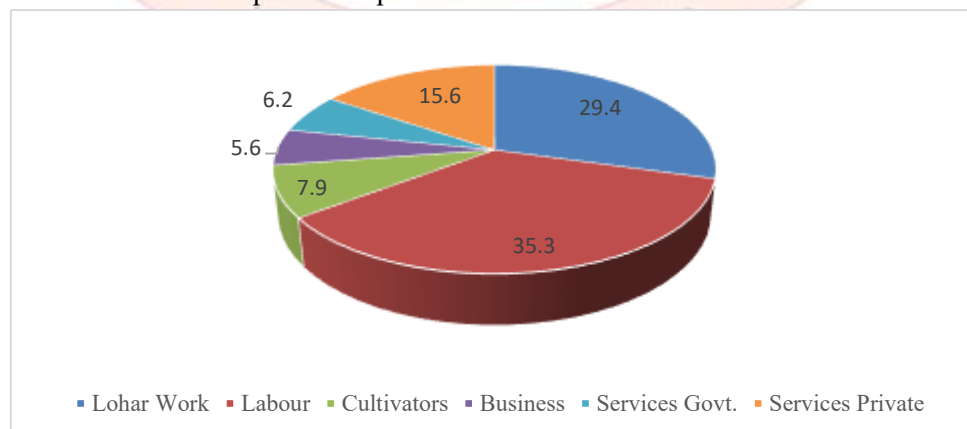


Fig.No.2 Occupational Structure of Lohar Community in Satara District 2023-2024

Conclusion:

The Lohar community in Satara district operates within a dual economic framework that attempts to balance ancestral craftsmanship with the demands of a modern service economy. Still, a significant 64.7% of the total population is engaged in manual labour and traditional blacksmithing. This shows that craftsmanship skills and physical endurance are still the family's primary means of survival. While this highlights a resilient connection to their heritage, it also reflects a continued dependence on labour-intensive work despite broader technological advancements in the region.

This economic landscape is further divided by geography, as major urban centres like Satara, Karad, and Patan have become vital hubs for those transitioning into government services, private sectors, and formal business. To support this shift, the Maharashtra State Skill Development Society provides essential training to help artisans adapt to modern industries. Conversely, smaller towns like Mahabaleshwar experience economic stagnation, with few professional opportunities outside of core labour.

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A Geographical Study of Road Density in Kolhapur District of Maharashtra State India.***Dr. Sandip Arjuna Patil**

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Abstract

Roads are the most important infrastructure in the development of human society. They accelerate economic, social and geographical progress. Road transport is essential for achieving the Sustainable Development Goals in the United Nations Agenda 2030. (UN 2017 and 2020) Road transport is an important infrastructure for the overall development of a country. Transport networks are important for accelerating economic and social development and facilitating and mobilizing the movement of resources, people, raw materials, industrial products, goods. Road transport is the only transport network that provides services directly to the doorsteps of consumers. Road safety can be achieved by improving the quality of the road network and roads. The International Road Federation (IRF) Strong and durable roads promote good, safe and sustainable development. (UN, 2017) The total number of roads available in a given area in any region in kilometers / percent of kilometers is road density. Road density is an index that indicates the capacity and development of communication transport in a region. Therefore, roads are an important indicator in the development of any nation / region Strengthening the road network and increasing rural and urban connectivity through projects like [Samruddhi Mahamarg](#), [Shaktipeeth Mahamarg](#), and Pune-Mumbai Parallel Road is the main agenda. (Government of Maharashtra, 2026) An assessment of the structural quality and density of the road network is essential for future improvement and sustainable development. The present research paper examines the geographical density of the road network in Kolhapur district of Maharashtra according to tehsil area and population.

Keywords - Road Density, Road Network, Sustainable Development, Kolhapur, Tehsil.**1. Introduction :**

Roads are the oldest and most popular mode of transport. Roads are the most important infrastructure for the development of human society. They accelerate the economic, social and geographical progress of man. Road transport is the major mode of transport in India in terms of transport share and contribution to the national economy. Road transport plays an important role in the development of any nation / region. Because roads are the means of delivering any goods / components to the doorsteps of the actual users. The density of the road network varies depending on the population and area of the region. **“Road density is the ratio of the total road network available in an area of any region in kilometers and percent of kilometers.”** High road density has a positive impact on the overall development of that region; while low road density has a negative impact on the overall development of that region. Therefore, there is a need to create a more secure road network to bring speed and ease in transportation. Accordingly, the Government of India and Maharashtra has planned the Mukhyamantri Baliraja Shet and Panand Road (Maharashtra) Scheme for rural regions. This scheme was approved on 15 December 2025. Under this scheme, unpaved Panand roads are being converted into paved roads. Meanwhile, the Central Government has launched the Pradhan Mantri Gram Sadak Yojana and 62,500 kilometers of roads will be constructed to connect more than 25,000 settlements across the country with paved roads during 2024-25 to 2028-29. The Central Road Transport Facilitation Fund (CRIF) has provided **130 projects** to the state of Maharashtra at a cost of Rs. **1994 crore**. New road projects have been approved. Which will increase rural connectivity. **NHAI** Road Development According to the Central Government, the target of construction of 5000 km of roads in the financial year 2026 is 5000 km, which includes expressways and six-lane highways. Overall,

these schemes will create paved roads and as a result, will help in making communication between rural and urban areas easier.

2. Objective: -

- The main objective of the present study (research) is to study the density of road network per 100 sq . km and per 1000 population in Kolhapur district according to tehsil and geographical area .

3. Data Collection and Methodology:

The research work is based on secondary data source and the secondary data is taken from Kolhapur District Socio - Economic Survey 2024-25 . Also the population data is taken from Kolhapur District Census Booklet 2011. Secondary data is collected through recent research techniques and after calculating it, tables, graphs and maps have been prepared with the help of computer . The density data of the road network obtained according to the taluka has been divided into low , medium and high density types using statistical formula.

$$\text{Formula – 1. Density (Per Sq. Km)} = \frac{\text{Road Length}}{\text{Geographical Area}}$$

$$\text{Formula – 2. Density (Per Sq. Km)} = \frac{\text{Road Length}}{\text{Population}}$$

4. Study Area:

Kolhapur district has been selected for the present study . The geographical area of Kolhapur district is 7685 square kilometers and this district ranks 18th in the state of Maharashtra in terms of area . Kolhapur district Of the state 2.5 percent of the area Is . Kolhapur District of Maharashtra State South and South West Plateau On the part Vasala Being The geographical extent of the district is from 15° 43' North latitude to 17° 10' North latitude and from 73° 40' East longitude to 74° 42' East longitude. District West Sahyadri Edges , To the north Waran River , East Partiality Krishna River And To the south Karnataka In the state Belgaum District Such Four : Border There are twelve talukas in Kolhapur district and these talukas are divided into three geographical divisions . The first is the Sahyadri mountain range and its sub - ranges, the second is the foothills and the third is the river plains. The average annual rainfall The average daily maximum temperature is 30 degrees Celsius and the minimum temperature is 21 degrees Celsius . The district has 12 talukas . And 4 revenue In the section Divided There are 1216 villages , 13 census districts as per Census 2011. Cities And Kolhapur This The only one Municipal Corporation So 9 municipalities There are . According to the 2011 census, the population of Kolhapur district is 38 lakh 70 thousand one. In which there are about 19 lakh 80 thousand 698 males and 18 lakh 95 thousand 343 females . The population density is 504 persons per square kilometer and the sex ratio is 957. While the total literacy rate is 81.51% . District 's West Sahyadri In the mountain range Dense Forest Being There Of origin Quantity More is . Therefore There Weather Cold It is . As is . From the west To the east Go So - so Of the offspring Quantity Less – less Happening 18.23 percent in the district On the ground Forest area Is .

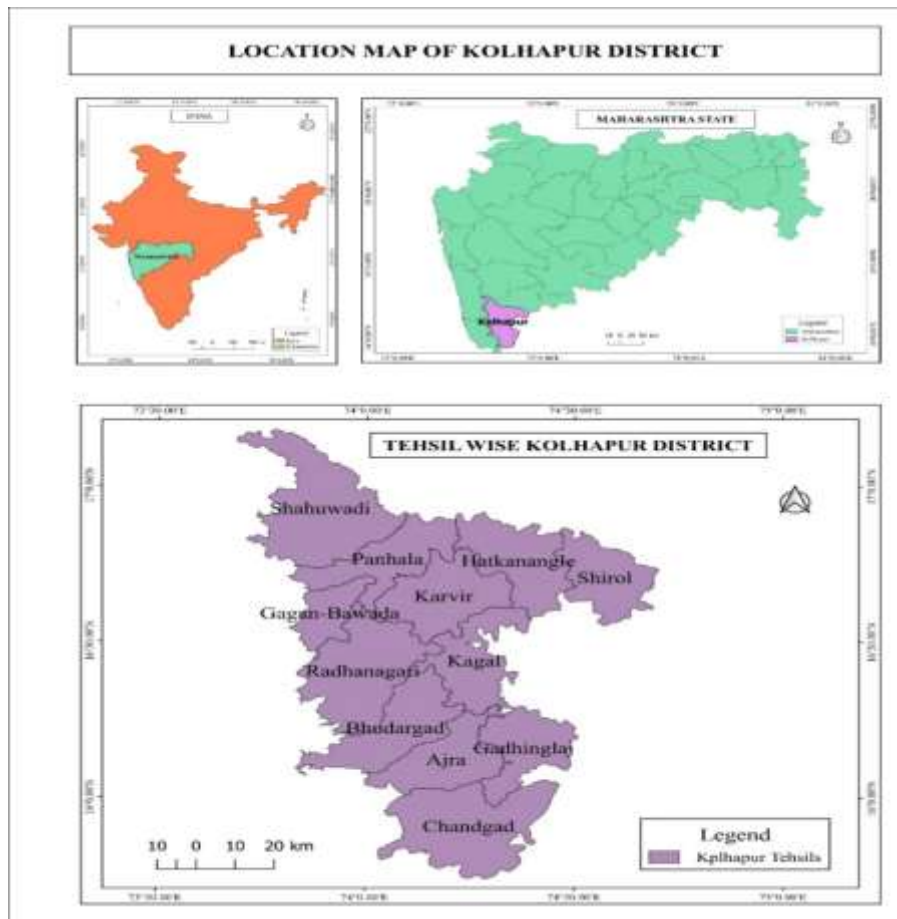


Table No. 01

Kolhapur District Road Density (Per 100 Sq. Km. and Per 1000 Population)

Sr. no.	Name of the Tehsil	Geographical Area Sq. Km	Road Length in Km	Density Per 100 Sq. Km.	Population in 2011 Census	Density Per 1000 Population
1	Shahuwadi	1043.52	796.61	0.76	180322	4.41
2	Panhala	568.68	695.75	1.22	251603	2.76
3	Hatkanangale	614.38	938.67	1.52	407228	2.30
4	Shirol	503.00	700.00	1.39	320133	2.18
5	Karveer	669.88	917.89	1.37	380224	2.41
6	Gaganbavada	282.30	204.28	0.72	35772	5.71
7	Radhanagari	892.04	860.16	0.96	199713	4.30
8	Kagal	547.30	723.22	1.32	230072	3.14
9	Bhudargad	643.53	698.16	1.08	150368	4.46
10	Ajra	548.74	587.05	1.06	103008	5.69
11	Gadhinglaj	480.92	734.64	1.52	198549	3.70
12	Chandgad	952.52	834.61	0.87	187220	4.45
	Total	7685	8691.04	1.13	3,876,001	2.24

Source: District Socio-Economic Survey- 2024-25 and Census of India Handbook 2011 .

5. Road Network in the District:

The total length of roads in Kolhapur district is 8691.04 kilometers , out of which 222.96 kilometers are national highways and 966.22 kilometers are state highways . Similarly, the length of major district roads is 2063.93 kilometers, the length of other district roads is 10493.94 kilometers and the length of rural roads is 3943. 99 kilometers.

The following national highways and state highways pass through Kolhapur district.

- 1. Mumbai - Pune - Bangalore (NH - 48)** - This National Highway is the main artery of Kolhapur district. It connects the major cities of Mumbai , Pune , Bangalore . Its old name is NH -04 . This highway passes through Hatkanangle , Karveer , Kagal talukas.
- 2. National Highway No. 166 (NH - 166)** - This highway connects Ratnagiri with Kolhapur, Sangli, Miraj and Solapur cities. It is the gateway to Konkan and South - West Maharashtra .
- 3. Kolhapur - Gaganbawda No. 166 C (NH – 166, C)** - This highway connects Kolhapur directly to the Konkan region, i.e. Kankavli, Rajapur route.
- 4. Kolhapur Gaganbawda Vengurla State Highway** - This state highway connects Kolhapur to Sindhudurg and National Highway No. 66 towards Goa. The total length of the National Highway in the district is 222.96 kilometers and the longest highway length by taluka is in Karvir taluka at 38.65. km the total length of state highways in the district is 966.22 kilometers. According to taluka, the longest state highway length is in Karvir taluka . It is 142 kilometers long . All the talukas of Kolhapur district are connected by the state highway.

Table No. 02

Rode Density (Per 100 Sp. Km.) in Kolhapur District

Sr. no.	Category	Class in %	Number of Tehsil	Name of Tehsils
1	Low	0.72 to 0.99	4	Gaganbavada , Shahuwadi , Chandgad , Radhangari ,
2	Medium	1.00 to 1.26	3	Ajra, Bhudhargad , Panhala
3	High	1.27 to 1.52	5	Kagal , Karveer , Shirol , Gadhinglaj , Hatkanangle.

Source – Created by the researcher.

Given Data (Density per 100 Sq. Km):

0.76, 1.22, 1.52, 1.39, 1.37, 0.72, 0.96, 1.32, 1.08, 1.06, 1.52, 0.87

Step 1: Find Minimum and Maximum

- Minimum Value = 0.72
- Maximum Value = 1.52

Step 2: Calculate Range

Range = $1.52 - 0.72 = 0.80$

Step 3: Divide into 3 Equal Classes (Low, Medium, High)

Class Interval = $0.8 / 03 = 0.27$ (approx.)

Step 4: Class Intervals

Class	Interval Range
Low	0.72 – 0.99
Medium	1.00 – 1.26
High	1.27 – 1.52

Step 5: Classification of Given Values

Low (0.72 – 0.99) 0.72, 0.76, 0.87, 0.96, **Medium** (1.00 – 1.26) 1.06, 1.08, 1.22

High (1.27 – 1.52) 1.32, 1.37, 1.39, 1.52, 1.52

Final Classification Summary

- **Low Density Areas** → 4 values
- **Medium Density Areas** → 3 values
- **High Density Areas** → 5 values

Table No. 03
Rode Density (Per 1000 Population) in Kolhapur District

Sr. no.	Category	Class in %	Number of Tehsil	Name of Tehsils
1	Low	2.18 to 3.35	05	Shirol , Hatkanangle, Karveer , Panhala , Kagal
2	Medium	3.36 to 4.53	05	Gadhinglaj , Radhangari , Shahuwadi , Chandgad , Bhudhargad ,
3	High	4.54 to 5.71	02	Ajra, Gaganbavada

Source – Created by the researcher.

Step 1: Find Minimum and Maximum

- Minimum Value = 2.18
- Maximum Value = 5.71

Step 2: Calculate Range

$$\text{Range} = 5.71 - 2.18 = 3.53$$

Step 3: Divide into 3 Equal Classes (Low, Medium, High)

$$\text{Class Interval} = 3.53 / 03 = 1.17 \text{ (approx.)}$$

Step 4: Class Intervals

Class	Interval Range
Low	2.18 – 3.35
Medium	3.36 – 4.53
High	4.54 – 5.71

Step 5: Classification of Given Values

Low (2.18 – 3.35) 2.18, 2.30, 2.76, 2.41, 3.35, **Medium (3.36 – 4.53)** 3.36, 3.70, 4.30, 4.41, 4.53, **High (4.54 – 5.71)** 4.54, 5.71.

Final Classification Summary

- Low Density Areas → 5 values
- Medium Density Areas → 5 values
- High Density Areas → 2 values

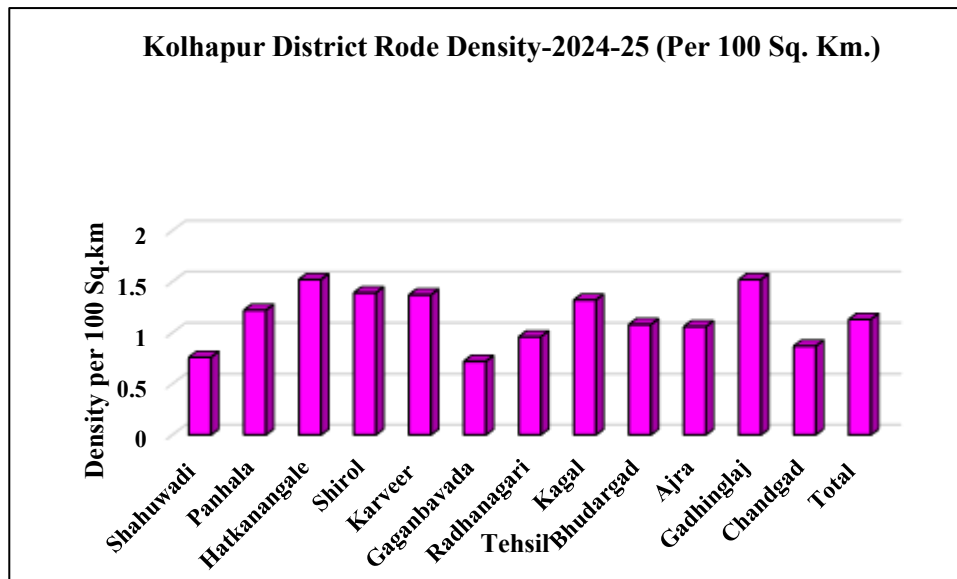
6. Road Network Density (Per 100 Sp. Km.):

Total road density per 100 in Kolhapur district Sq. KM area is 1.130 The highest density of road network per unit geographical area is recorded in Hatkanangale and Gadhinglaj talukas at 1.52 This is because the length of roads per square kilometer is more in these talukas compared to the geographical area. The lowest road density per 100 square kilometers in the district is in Gaganbawda (0.72) Shahuwadi (0.76) and Chandgad taluka (0.87) have been recorded because the area and length of roads are almost the same in these talukas .

Considering the road density per 100 square kilometers, the twelve talukas of Kolhapur district have been divided into three parts . In which low density is 0.72 to 0.99, medium density is 1.00 to 1.26 and high density is 1.27 to 1.52 The low road density section includes four talukas . It includes talukas located in the foothills of the Sahyadri mountains like Gaganbawada , Shahuwadi , Chandgad , Radhanagari and has unfavorable natural structure . The section with medium road density per 100 square kilometers includes three talukas . It records the talukas of Ajra , Bhujargad , Panhala , while the high road density zone includes five talukas with 1.27 to 1.52 per 100 square kilometers , including Kagal , Karveer , Shirol , Gadhinglaj and Hatkanangale talukas . The talukas with high road density generally fall on the plains to plateaus of rivers .

Their natural structure is favorable for the construction of road networks . All these talukas are leading in the agricultural and industrial sectors . Therefore, the development of the road network is seen.

Graph no. 01

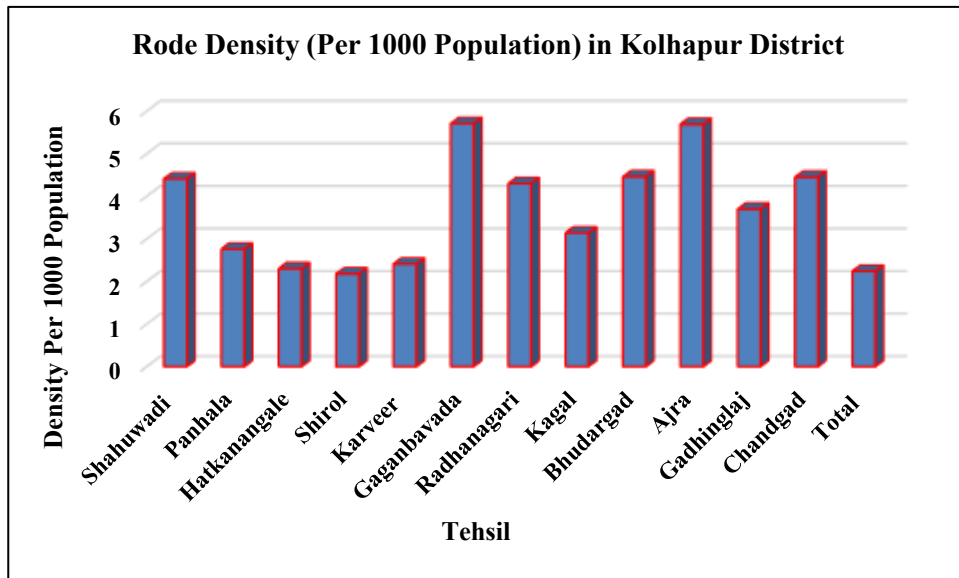


Source – Created by the researcher.

7. Road Network Density (Per 1000 Population)

The density of road network per 1000 population in all tehsils of Kolhapur district has been found to be 2.18 to 5.71 kilometers . That is, there are 2.18 to 5.7 roads available per 100 population . The highest density of road network per thousand population has been recorded in two talukas , Ajra and Gaganbawda (4.54 to 5.71) . This is because the population in these two talukas is less compared to the length of the road . This region is in the main range of the Sahyadri mountains . Therefore, the natural structure here is unfavorable. As a result, the population is low and there are limitations on the construction of roads due to the natural structure . After studying the density of roads per thousand population, 03 of the twelve talukas of Kolhapur district It is divided into areas . In which the density of the low road network is 2.18 to 3.35 and a total of 05 talukas namely Shirol , Hatkanangale , Karvir , Panhala , Kagal have been recorded . Because these talukas geographically fall in the plain to plateau region, agro-industrialization has developed in these talukas . As a result, the population is higher than the road network . Therefore, the road network per thousand population is low. Medium road density (3.36 to 4.53) includes five talukas of Kolhapur district. They are Gadhinglaj, Radhanagari , Shahuwadi , Chandgad , Bhudargad talukas are recorded . These talukas fall in the foothills of the Sahyadri Mountains. Therefore, the natural structure here is generally unfavorable . As a result, the population density is low. Therefore, these talukas fall in the medium category in terms of road density per 1000 population. The highest road density per thousand population (4.54 to 5.71) is in two talukas of Ajra and Gaganbawda ; because these two talukas fall in the main range of the Sahyadri Mountains , the natural structure here is very unfavorable. As a result, the population density is low. Compared to other talukas, the population here is less. Therefore, these talukas fall in the high road density category per thousand population. Overall, the talukas which are in the high category in terms of road density per hundred square kilometers are also recorded in the low category in terms of road density per thousand population and the talukas which are in the low category in terms of road density per thousand population are recorded in the high category in terms of road density per 100 square kilometers. In general, the regions where the natural structure is unfavorable; In such regions, the road density ratio is low and, in such regions, where the natural structure is favorable; In such regions, the road density ratio is seen to be high.

Graph no. 02



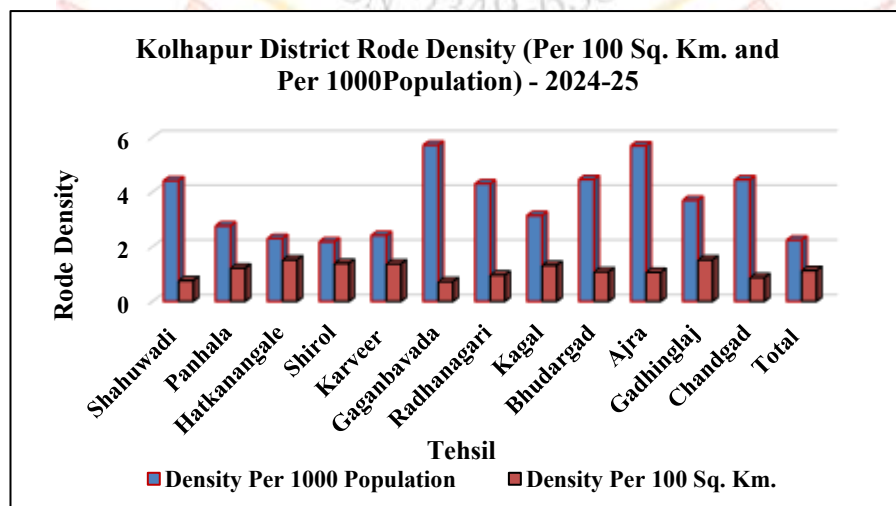
Source – Created by the researcher.

8. Evolution of Road Density / Road Density Evaluation:

There is a difference between the density of road network per 100 square kilometers and the density of roads per one thousand population. Since the rate of population growth and the rate of growth of road network do not match each other, it is very difficult to build new roads according to the population growth. But to maintain the balance of road development in the country, we / people can control the population growth. In terms of area, Gadhinglaj taluka is found to have the highest road density (1.52) and Gaganbawda (5.71) is found to have the highest road density in terms of population.

Hatkanangale tehsil has a higher population than other tehsils and the length of roads in the district is also the highest. But the length of roads is not sufficient compared to the population distribution. It seems that only 2.30 kilometers of road density is available in these talukas per thousand population. The lowest population distribution compared to other tehsils of the district is in Gaganbawda taluka. Therefore, the highest road density is found at 5.71 kilometers per thousand population. But compared to the geographical area, the road density per 100 square kilometers is found to be the lowest, i.e. 0.72 square kilometers. Because Gaganbawda tehsil is at a lower level in economic and social development compared to other tehsils of the district. Graph number one shows the density of road network per 100 square kilometers per 100 square kilometers. Graph number two shows the density of road network per 1000 population per tehsil.

Graph no. 03



Source – Created by the researcher.

Graph number three shows the density of road network per 100 square kilometers and per 1000 population per tehsil in Kolhapur district.

9. Conclusion and solutions:

The road network of the district is not fully developed and the length of roads in the district is uneven according to the tehsils. The talukas showing high density of road network per 100 square kilometers fall in the low density category of road network per one thousand population. The talukas of Ajra and Gaganbawda fall in the low density category of road network per 100 square kilometers while the density of road network per 1000 population is high. In general, the natural structure of the district is seen to have an impact on the extent of road network in terms of area and population. In tehsils where the natural structure is unfavorable, the ratio of road network per one thousand population is seen to be higher due to less population. Whereas in tehsils where the natural structure is favorable, the ratio of road density is found to be lower due to more population.

10. Solution:

1. Road network should be developed on an equal scale in the study area.
2. The density of all types of roads is low in the hilly regions. To increase it, priority should be given to hilly regions while developing new roads.
3. Road construction should be done before the monsoon season; this will increase the strength and durability of the road.
4. New flyovers, subways, with the help of modern technology in road construction, it is necessary to increase the length and width of old roads by building tunnels etc. This will help reduce the growing traffic problem.
5. Connectivity should be created between existing roads and newly constructed roads using modern technology; thus, accessibility for transportation will be provided.
6. While planning road development, all kinds of changes that will happen in the next 35 to 40 years should be considered. Mainly the increasing population and the increasing number of vehicles. Because the population and the number of vehicles will increase day by day. But the geographical area will never increase. Therefore, the only way available to us is to develop roads in a planned manner.
7. To develop the road network according to the population, it is necessary to control the additional population growth in the district. Because no matter how much infrastructure we create and the population increases many times over, the infrastructure created will always be in short supply due to the additional population.

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A Geographical Review of Wheat Productivity In India

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India, a country with diverse geography and rich agricultural history, contributes significantly to the world's food production. Among the multitudes of crops cultivated, wheat holds a crucial place, forming a core component of the Indian diet. However, this second important food crop of India is not uniformly distributed throughout this vast subcontinent. Wheat cultivation in India prominently takes place in the Wheat Belt, which comprises several states across the northern and central parts of the country. The wheat-producing states, which are having the highest productivity, are Punjab, Haryana, Uttar Pradesh, Uttarakhand, Rajasthan, Madhya Pradesh, Bihar, Gujarat, Himachal Pradesh, West Bengal & Jharkhand. The moderate productivity region is spread in three parts, i.e. northern part of India, northern part of peninsular India and northeastern part of India. The states namely Jammu Kashmir, Chandigarh, Delhi, Assam, Nagaland, Manipur, Arunachal Pradesh, Meghalaya, Dadra & Nagar Haveli, Maharashtra, Chhattisgarh, Karnataka, & Telangana occupied by the moderate wheat productivity. Low productivity region of wheat includes the states and union territories located in the coastal and northeastern Himalayan area of India. The states, namely Sikkim, Mizoram, Tripura, Goa, Odisha, Kerala, Andhra Pradesh, Tamilnadu, Andaman & Nicobar Islands, Daman Diu and Pondicherry have recorded low productivity. Each region has unique physiographic, climatic and socio-economic conditions contributing to the varied characteristics of the wheat produced in India.

Key Words : *Region, Diverse, Multitudes, Cultivation, Distributed, Subcontinent, Wheat Belt, States, Production, Productivity, High, Moderate, Low, Physiographic, Climate, Soils, Rainfall, Irrigation, Socio-Economic, Inequalities, Fertilizers, Friendly, Agro, Territories, Topography, Tillage, Drought, Technologies, Sustainable.*

Introduction

Even today, in the first quarter of 21st century, India heavily rely on agriculture for economic and employment purposes. With a diverse geography and rich agricultural history, India contributes significantly to the world's food basket. Food grains are essential crops that form the backbone of India's agriculture, occupying a significant portion of the country's cultivated land. They include cereals like rice and wheat, pulses like tur, gram and soya bean, which are more important for both nutrition and soil fertility. Food grain production in India is crucial for national food security, economic stability, and the livelihood of a significant portion of the population. It directly impacts the dietary needs of the country's diverse population and supports agricultural sustainability. Increased production also contributes to economic growth by creating jobs, generating income, and boosting foreign exchange earnings and also supports the growth of related industries like processing, storage, and transportation. The Indian government recognizes the importance of food grain production and has implemented various initiatives, such as the National Food Security Mission (NFSM), to boost agricultural productivity of food grains. In the 2023-24 crop year, India's food grain production reached a record 332.22 million tons, driven by high yields of wheat and rice. This was an increase of 2.61 million tons compared to the previous year, according to the final estimates released

by the Ministry of Agriculture. Wheat acts as a reservoir of essential nutrients, playing an instrumental role in the dietary regime of many Indians. For a substantial segment of India's population, wheat forms the fundamental grain in their daily consumption. The cultivation of wheat offers employment avenues to innumerable farmers, workers, and rural inhabitants in India. India is the second-largest wheat producer globally and accounts for about 14% of the world's total wheat production. The Green Revolution in India significantly increased wheat production, transforming the country from a food-importing nation to a self-sufficient one. The major wheat-producing states are Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, and Rajasthan.

Objective

The major objective of this research paper is to assess the facts related to production of wheat, along with some important remedial measures to increase the production of wheat along with the overall development of the study region i.e., India.

Data Base And Methodology

- 1) The agricultural statistical data used for this research paper is secondary in nature and taken from, Normal Estimates of Area, Production and Yield of selected principal crops, of May, 2021, which is published by Government of India, Ministry of Agriculture and Farmers Welfare, Directorate of Economics and Statistics, Agricultural Statistics Division, New Delhi.
- 2) In order to assess the regional differences in the levels of production and to delimit the weaker areas from the point of view of production of wheat, a Statistical technique is used, which is introduced by Jasbir Singh (1976). The average crop yields and proportions of this crop in the total harvested area have been used as twin-elements for measuring the index of the level of wheat production. For an objective measurement of the level of productivity of wheat, the relative crop yield and concentration indices arranged in ranking order and computed into average ranking coefficient, known as *the crop yield and concentration indices ranking coefficient*. This coefficient is calculated as follows:

$$Y_i = Y_{ae} / Y_{ar} \times 100$$

Where,

Y_i - is the crop yield index,

Y_{ae} - is the average yield per hectare of wheat in the component enumeration unit,

Y_{ar} - is the average yield of wheat in the entire region.

$$C_i = P_{ae} / P_{ar} \times 100$$

Where,

C_i - is the crop concentration index,

P_{ae} - is the percentage strength of wheat to the total harvested area in an enumeration unit,

P_{ar} - is the percentage strength of wheat to the total harvested area in the nation.

The crop yield and concentration indices thus derived for all the regional units and the crops are ranked separately. Yield and concentration ranks for individual crops are added and there after divided by 2, which gives the crop yield and concentration indices ranking coefficient.

$$R_c(Y_i \& C_i) = Y_i + C_i / 2$$

Where,

R_c - is ranking coefficient,

Y_i - is the crop yield index,

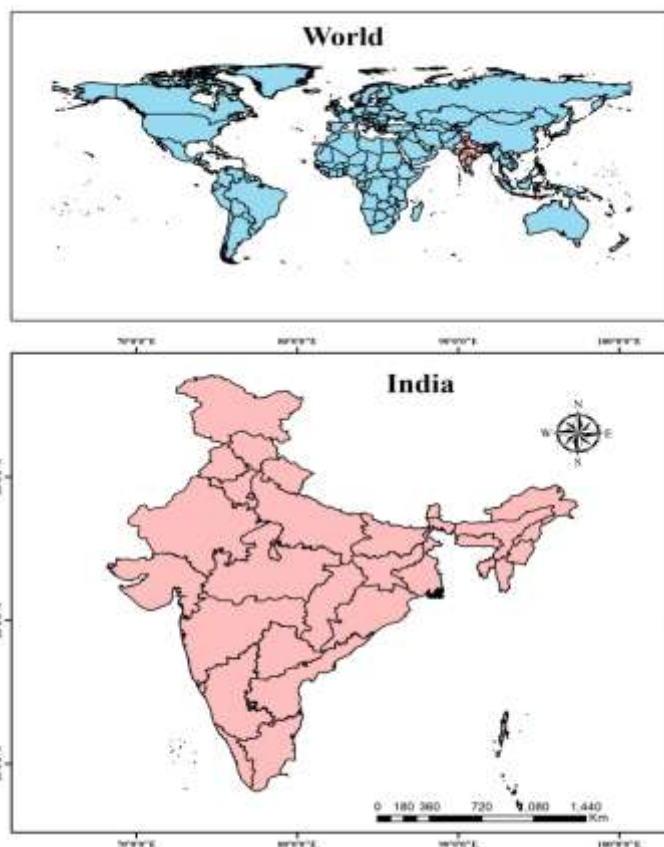
C_i - is the crop concentration index,

The result thus derived will give us an idea of the level of productivity of wheat, the lower the ranking coefficient, the higher the level of productivity of wheat and vice versa. The values, thus derived for each enumeration unit are arranged in descending order and divided in to three equal parts to obtain High, Medium and Low yield crop concentration regions, which are presented with the maps for further analysis.

Location And Geographical Profile Of The Study Region

India lies in the southern and eastern hemisphere (Fig No- 01) and extends in between $8^{\circ}41'N$ to $37^{\circ}6'1'N$ latitudes and $68^{\circ}07'1'E$ to $97^{\circ}25'1'E$ longitudes. The tropic of Cancer passes through eight central states bisecting India in to two parts i.e., North and South. The north-south extent of India is 3214 kms, while, its east-west width is 2933 kms. India's total land frontier is

Fig No- 01



15200 kms, along with a maritime boundary of 6100 (7516 kms with Islands). With an area of 32,87,263 sq kms India is a seventh largest country in the world. Census 2011 covered 35 states and union territories along with 640 districts, 5924 tahsils, 7936 towns and 6.41 lakh villages. India is having a population of 1,21,01,93,422, out of which 62,37,24,248 are males and 58,64,69,174 are females along with the growth rate of 17.64 percentage. India is second largest country in the world with 1210 million of population as per 2011 census.

India is a country of great geographical diversity, which forms a major part of South Asia, which encompasses vast areas of diverse landmasses. In the north, there are lofty ice capped Himalayas along with the great Indo-Gangetic plains at its foothill zone, which is known for its alluvial fertile soils. Thar, the sandy desert is also a part of this Great Plains. The northern India is surrounded by the nations like Pakistan, Afghanistan, China, Nepal, Bhutan, Bangladesh and Myanmar. The southern peninsular India comprising of uneven plateau along with the Eastern and Western Coastal Plains surrounded by Arabian Sea, Sea of Bengal and Indian Ocean. Due to its vastness and diversities India is also known as Indian Sub-Continent.

India is drained by Ganga, Yamuna, Brahmaputra in the north and Mahanadi, Narmada, Godavari, Krishna, Kaveri in the south along with their number of tributaries. The effect of physiographic and climatic diversity is also seen in the soils and vegetation of the country. The country has variety of soils like alluvial soils, black cotton soils, red lateritic soils, saline marshy soils along with variety of vegetation like tropical wet evergreen forest to alpine Himalayan Forest with special character of monsoon deciduous forests.

Indian wildlife is comprised of variety animals, birds and insects living in forests, which offer wide range of habitat. India is having highest percentage of its geographical area under cultivation. Though half of India is having its location in temperate zone, the climate of India is strongly affected by the tropical monsoon winds. Indian landmass gets an abundance of sunshine from the tropical sun and splashing rain from the monsoons, the most important factors of Indian climate.

Two third of northern India is having mean temperature of 210c to 270c, on the other hand, the southern part of India experiences rather warm tropical climate with 300c to 370c temperature. The western disturbances and tropical cyclones with limited rain showers control the winter weather conditions of India, while, high temperature and low humidity characterizes the summer season. The hot wet monsoons or the rainy season is a unique characteristic of Indian climate with an average of 118 cms and 90% of total rainfall.

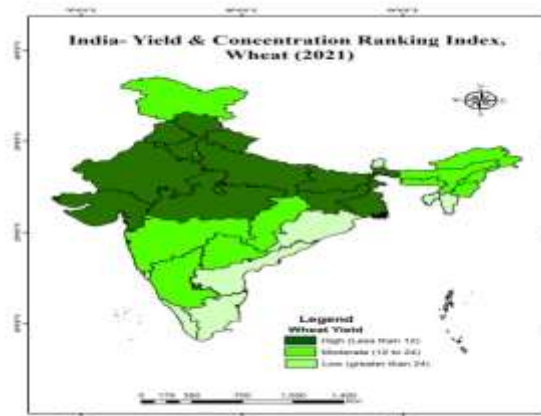
Wheat Productivity Regions of India

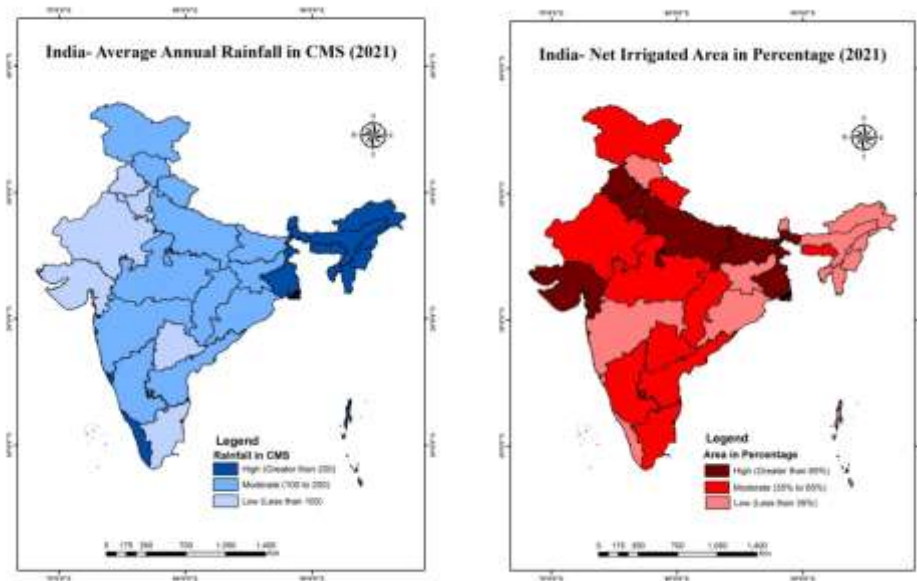
In Pre-Green Revolution period (before the 1960) India was highly dependent on imports to meet its domestic demand for wheat. Productivity was low, with tall plant varieties prone to lodging, poor tillering, meager irrigation facilities and disease susceptibility. The introduction of high-yielding semi-dwarf varieties from Mexico, along with better irrigation and chemical fertilizers, dramatically increased yields. This turned India from a food-deficient nation into a self-sufficient one. Research and development coordinated by institutions like the Indian Council of Agricultural Research (ICAR), led to the release of numerous high-yielding, disease-resistant wheat varieties. In India, wheat productivity has increased significantly since the Green Revolution, reaching record-high production levels in recent years. Key factors contributing to this growth include advanced farming technologies, improved seeds, and widespread irrigation. However, the sector faces challenges from climate change (Rainfall Distribution), water scarcity, and soil degradation. For an objective measurement of the level of productivity of wheat, the relative crop yield and concentration indices arranged in ranking order and computed into average ranking coefficient, known as the crop yield and concentration indices ranking coefficient. Thus, the derived values are categorized in to three equal parts, as high, medium and low wheat productivity regions (Fig No- 02).

High Wheat Productivity Region

The most productive regions of wheat cultivation in India are the fertile northwestern plains and the northern Gangetic plains. These areas are benefited by a combined effect of soils, climate, and advanced agricultural practices. The wheat-producing states, which are having the highest productivity, are Punjab, Haryana, Uttar Pradesh, Uttarakhand, Rajasthan, Madhya Pradesh, Bihar, Gujarat, Himachal Pradesh, West Bengal & Jharkhand. Punjab has the highest wheat yield in the country and also known as the "Wheat Granary of India", followed by Haryana, which is having the second-highest wheat yield per hectare. Uttar Pradesh as a whole is the largest wheat producer by total volume due to its highest area under cultivation in India. The success of this region in wheat production and productivity is the ultimate result of several intervened factors. The alluvial soils of the Indo-Gangetic plains are rich in nutrients and ideal for wheat cultivation. A reliable and extensive irrigation network, including canals and tube

Fig No- 02





wells, ensures a steady water supply during the crucial growth stages of the wheat crop in rabi season. This is the first region which widely adopted the HYVs along with modern farming techniques introduced during the Green Revolution, which, significantly boosted yields per unit area. The cool winters and dry springs provide the optimal temperature and required sunlight conditions for wheat to thrive, especially during the grain-filling and ripening stages. Higher levels of mechanization in farming operations allow for more efficient and timely sowing and harvesting, which maximizes the wheat yield.

Moderate Wheat Productivity Region

The regional distribution of productivity of wheat adduces that, the majority states of peninsular India are having moderate or medium type of productivity of wheat. The moderate productivity region is spread in three parts, i.e. northern part of India, northern part of peninsular India and northeastern part of India. The states namely Jammu Kashmir, Chandigarh, Delhi, Assam, Nagaland, Manipur, Arunachal Pradesh, Meghalaya, Dadra & Nagar Haveli, Maharashtra, Chhattisgarh, Karnataka, & Telangana occupied by the moderate wheat productivity. Agriculture in this region is highly diversified with the productivity of wheat. Majority of these states are still suffering with inadequate irrigation facilities along with the traditional and subsistence way of agriculture practices. Though, the states in the northern peninsular India are having moderately developed irrigation facilities, the meager rainfall in the monsoon period along with the competition with the other cash crops, which affects the wheat productivity of this region. The majority states in the northeastern India are enjoying pleasant climate along with ample water supply from monsoon and irrigation facilities from Himalayan Rivers, the topography and competition with rice, hampers the production and productivity of wheat.

Low Wheat Productivity Region

Low productivity region of wheat includes the states and union territories located in the coastal and northeastern Himalayan area of India. The states, namely Sikkim, Mizoram, Tripura, Goa, Odisha, Kerala, Andhra Pradesh, Tamilnadu, Andaman & Nicobar Islands, Daman Diu and Pondicherry have recorded low productivity. Majority area of Northeastern Himalayan states is occupied by undulating topography and is under forest cover along with large scale rice cultivation, ultimately resulted into very little production and very low productivity of wheat. Low wheat productivity in these states is caused due to adverse climatic and physiographic conditions along with the poor soils, meager irrigation facilities, less per hectare use of fertilizers and low crop intensity. Hot and humid climate and excessive rainfall more than requirement of wheat crop in the coastal states, affect the production and productivity of wheat. Solutions, includes development of stress-resistant varieties, adopting water-saving techniques like zero tillage and water harvesting, and implementing precision farming to mitigate the impacts of climate which, boost wheat

yields. A small farm size, fragmented and scattered landholdings also hampers the production and productivity of wheat. Overall lower productivity makes farmers harder to adopt new technologies and efficiently implement innovative farming practices.

Conclusions

The above analysis reveals the regional inequalities and disparities in wheat production and productivity of India. The states namely Punjab, Haryana, Uttar Pradesh, Uttarakhand, Rajasthan, Madhya Pradesh, Bihar, Gujarat, Himachal Pradesh, West Bengal & Jharkhand produces largest volume of wheat and are at the top of the list of wheat productivity. These states are experiencing pleasant climatic conditions, long and widespread patches of fertile soils, developed infrastructure of irrigation along with perennial Himalayan rivers, technically advanced store houses, abundant use of HYV seeds and fertilizers, ample but effective rainfall, use of mechanized farming techniques and agro-friendly farmers attitude towards commercial wheat farming, promote highest wheat productivity in this region.

The states and union territories which are experiencing favorable climatic conditions, fertile soils, ample irrigation facilities, high percentage of cropping intensity and use of enough fertilizers are having moderate wheat productivity. The states namely Chandigarh, Jammu Kashmir, Delhi, Manipur, Arunachal Pradesh, Maharashtra, Nagaland, Meghalaya, Chhattisgarh, Dadra & Nagar Haveli, Karnataka, Assam & Telangana predominantly located in the northern peninsular India, occupied by the moderate wheat productivity. These states are also known for their high crop intensity, especially of oilseeds like soybean, cash crops like sugarcane, cotton, tobacco along with some important millet.

At the other end of the scale, the states and union territories which are having extreme climatic conditions, undulating and forested topography, lower crop intensity, rain fed agriculture with negligible irrigation facilities, very little use of fertilizers and farmers negative approach towards adopting modern way of agriculture are some of the major responsible elements for the low level of agricultural productivity. The states, namely Sikkim, Mizoram, Tripura, Goa, Odisha, Kerala, Andhra Pradesh, Tamilnadu, Andaman & Nicobar Islands, Daman Diu and Pondicherry have recorded low productivity.

Scaling the adoption of practices such as zero tillage, crop rotation, and residue management can improve soil health, conserve water, and reduce reliance on chemical inputs. Greater investment in agricultural research and development is needed to breed new varieties that offer higher yields and better tolerance to heat, drought, and new pests. Precision farming technologies, including satellite monitoring and AI advisories can optimize resource use and help farmers make data-driven decisions. Government schemes, including robust Minimum Support Price (MSP) mechanisms, crop insurance, and infrastructure development, must effectively reach all farmers, especially smallholders in underserved regions. Stronger Farmer Producer Organizations (FPOs) can empower farmers with better market access and collective bargaining power.

Enhancing agricultural extension services and farmer training programs will ensure that knowledge of modern farming techniques, sustainable practices, and market dynamics reaches the ground level. In conclusion, India possesses the potential to not only maintain its self-sufficiency in wheat but also to strengthen its position as a global agricultural leader. However, this future hinges on its ability to strategically address long-standing challenges, particularly the looming threat of climate change and resource over-exploitation. By harmonizing traditional wisdom with modern sustainable practices, India can build a resilient, prosperous, and food-secure future for its vast population.

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Comparative Analysis of Pre, During and Post-Flood Water Quality of the Krishna River at Sangli Using WQI

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Abstract

Flood events significantly alter the physical, chemical, and biological characteristics of river systems, thereby affecting overall water quality. The Krishna River at Sangli, Maharashtra, has experienced recurrent and severe flood events, notably in 2005, 2019, 2021 and 2023 causing substantial environmental and socio-economic impacts. The present study assesses the influence of flood conditions on river water quality by comparing pre-flood, during-flood, and post-flood periods using the Water Quality Index (WQI) approach. Key physicochemical parameters analyzed include pH, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Dissolved Solids (TDS), turbidity, nitrates, and chlorides. The results reveal significant deterioration in water quality during flood stages due to enhanced surface runoff, sediment transport, and influx of agricultural and urban pollutants. Although partial improvement was observed in the post-flood period, water quality did not immediately return to baseline conditions. The study emphasizes the importance of continuous monitoring and integrated river basin management.

Key Words: Flood Impact, Water Quality Index (WQI), Krishna River Water Pollution

Introduction:

Rivers are vital freshwater resources that support drinking water supply, agriculture, fisheries, and industrial activities. However, extreme hydrological events such as floods significantly alter river ecosystems. Floods increase surface runoff, soil erosion, and the transport of pollutants such as agricultural chemicals, sewage, and industrial waste into river systems. The Krishna River is one of the major rivers in peninsular India, and Sangli city frequently experiences flood events due to heavy monsoon rainfall and upstream dam releases. These floods influence the physicochemical properties of river water, affecting water usability and aquatic life. The Water Quality Index (WQI) is an effective tool that integrates multiple water quality parameters into a single numerical value, simplifying interpretation and classification of water quality status.

Problem Statement:

The Krishna River at Sangli experiences recurring flood events that may significantly alter water quality. However, limited systematic studies have compared water quality before, during, and after flood situations using an integrated index-based approach. There is a need to assess how flood events impact water pollution levels and to evaluate recovery patterns for sustainable river management.

Objectives:

1. To analyze the physicochemical parameters of Krishna River water at Sangli.
2. To calculate the Water Quality Index (WQI) for pre-flood, during-flood, and post-flood periods.
3. To compare variations in water quality across different flood stages.
4. To evaluate the impact of flood events on river water pollution levels.
5. To suggest management measures for maintaining water quality during extreme hydrological events.

Hypothesis:

1. **Null Hypothesis (H₀):** Flood events do not significantly affect the water quality of the Krishna River at Sangli.

- 2 **Alternative Hypothesis (H₁):** Flood events significantly alter the water quality of the Krishna River at Sangli.

Study Area:

Sangli city is located in the southern part of Maharashtra, India, along the banks of the Krishna River. Geographically, it lies at approximately 16.85° N latitude and 74.58° E longitude. The region experiences heavy monsoon rainfall between June and September, often leading to flooding. Flood events commonly occur due to intense precipitation combined with the release of water from upstream reservoirs such as the Koyna and Almatti dams, significantly influencing the hydrological regime and water quality of the river.

Research Methodology and Data Collection:

Water samples were systematically collected from selected sampling stations along the Krishna River at Sangli to assess seasonal variations in water quality. Sampling was conducted during three distinct phases: pre-flood (before monsoon peak), during-flood (peak flood stage), and post-flood (after flood recession) to enable comparative analysis. The collected water samples were analyzed for key physicochemical parameters including pH, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Dissolved Solids (TDS), turbidity, nitrates, and chlorides. All analyses were performed using standard laboratory procedures recommended by APHA guidelines to ensure accuracy and reliability.

1. Water Quality Index (WQI) Calculation-WQI was calculated using the weighted arithmetic index method:

$$WQI = \frac{\sum(Q_i \times W_i)}{\sum W_i}$$

2. WQI Classification-

WQI Value	Water Quality Status
0–25	Excellent
26–50	Good
51–75	Poor
76–100	Very Poor
>100	Unsuitable

Sample Data and WQI Calculation:

Table- 1.1 Samples Observed Values

Parameter	Standard (Si)	Pre-Flood	During-Flood	Post-Flood
pH	8.5	7.5	7.2	7.4
DO (mg/L)	5	6.8	4.2	5.5
BOD (mg/L)	3	2.5	6.5	4.0
COD (mg/L)	10	8	18	12
TDS (mg/L)	500	420	750	600
Turbidity (NTU)	5	4	25	10
Nitrates (mg/L)	45	20	40	30
Chlorides (mg/L)	250	150	220	180

Table- 1.2 WQI Results (Calculated)

Stage	WQI Value	Water Quality Status
Pre-Flood	48	Good
During-Flood	118	Very Poor
Post-Flood	72	Poor

Results and Discussion:

1. Pre-Flood Condition-

During the pre-flood period, the Krishna River at Sangli exhibited relatively stable and acceptable water quality conditions. The observed pH value was 7.5, which lies well within the permissible limit of 8.5, indicating neutral to slightly alkaline water suitable for aquatic life. Dissolved Oxygen (DO) was recorded at 6.8 mg/L, exceeding the minimum standard of 5 mg/L, suggesting favorable conditions for aquatic organisms. Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) values were 2.5 mg/L and 8 mg/L, respectively, both within permissible standards (3 mg/L for BOD and 10 mg/L for COD), reflecting low organic and chemical pollution. Total Dissolved Solids (TDS) measured 420 mg/L, below the standard limit of 500 mg/L, indicating minimal dissolved contamination. Turbidity was 4 NTU, within the acceptable limit of 5 NTU, signifying low suspended sediment concentration. Nitrate (20 mg/L) and chloride (150 mg/L) concentrations were also well below their respective standards (45 mg/L and 250 mg/L). The calculated WQI value of 48 classified the water as “Good”, confirming that the river water was suitable for most uses with minimal treatment prior to the flood event.

2. During-Flood Condition-

Significant deterioration in water quality was observed during the flood stage. The pH slightly decreased to 7.2, though still within acceptable range. However, DO levels dropped to 4.2 mg/L, falling below the recommended standard of 5 mg/L, indicating oxygen stress in the aquatic system. BOD increased sharply to 6.5 mg/L, exceeding the standard limit of 3 mg/L, while COD rose to 18 mg/L, surpassing the permissible limit of 10 mg/L. These elevated values indicate a substantial increase in organic and chemical pollutants entering the river during flood conditions. TDS increased to 750 mg/L, exceeding the standard limit of 500 mg/L, suggesting enhanced transport of dissolved solids. Turbidity showed a drastic rise to 25 NTU, five times higher than the permissible limit (5 NTU), reflecting intense sediment load and soil erosion. Nitrate levels increased to 40 mg/L, approaching the standard limit, while chloride rose to 220 mg/L, indicating urban and agricultural runoff influence. The WQI value escalated to 118, categorizing the water as “Very Poor.” These findings confirm that floodwaters significantly increased sediment transport and pollutant concentration, leading to temporary degradation of river water quality.

3. Post-Flood Condition-

In the post-flood stage, partial recovery of water quality was observed. The pH improved to 7.4, remaining within safe limits. DO levels recovered to 5.5 mg/L, returning above the minimum standard. BOD and COD decreased to 4.0 mg/L and 12 mg/L, respectively; although lower than flood values, they remained slightly above permissible limits, indicating residual organic pollution. TDS reduced to 600 mg/L, still exceeding the standard limit, while turbidity declined to 10 NTU, showing significant improvement but remaining above recommended levels. Nitrate (30 mg/L) and chloride (180 mg/L) concentrations also declined compared to flood stage. The WQI value improved to 72, placing the river in the “Poor” category. Although the river showed signs of ecological recovery, some parameters remained above permissible limits, indicating delayed restoration after flood recession.

Conclusion:

The study clearly demonstrates that flood events significantly influence the water quality of the Krishna River at Sangli. The Water Quality Index values showed deterioration during flood periods due to increased runoff, sediment load, and pollutant influx. Although post-flood recovery was observed, water

quality did not immediately return to pre-flood conditions. Therefore, the null hypothesis is rejected, and it is concluded that flood events have a significant impact on river water quality.

Recommendations:

1. Continuous water quality monitoring during monsoon season.
2. Installation of early warning systems for pollution spikes.
3. Control of untreated sewage discharge into the river.
4. Promotion of sustainable agricultural practices to reduce fertilizer runoff.
5. Strengthening river basin management policies.

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लोणंद कृषिउत्पन्न बाजारसमितीमध्ये शेतमाल विकणाऱ्या शेतकऱ्यांच्या समस्यांचा भौगोलिक अभ्यास

संशोधक विद्यार्थी
हाके तानाजी रामचंद्र

गोषवारा :-

लोणंद कृषिउत्पन्न बाजारसमिती ही परिसरातील शेतकऱ्यांसाठी महत्त्वाची बाजारपेठ आहे. सातारा जिल्ह्यातील विविध गावांमधून शेतकरी आपला भाजीपाला, धान्य, ऊस, फळे इत्यादी शेतमाल विक्रीसाठी येथे आणतात. या बाजारपेठेचा भौगोलिक परिसर, हवामान, दळणवळण व्यवस्था आणि पायाभूत सुविधा यांचा शेतकऱ्यांच्या आर्थिक स्थितीवर थेट परिणाम होतो. भौगोलिक दृष्ट्या काही गावे बाजारपेठेपासून दूर असल्यामुळे वाहतूक खर्च वाढतो. खराब रस्ते, अपुरी सार्वजनिक वाहतूक आणि वाढते इंधन दर यामुळे शेतकऱ्यांचा नफा कमी होतो. तसेच अनियमित पावसामुळे आणि दुष्काळी परिस्थितीमुळे उत्पादनात चढ-उतार होतात, ज्याचा परिणाम बाजारातील दरांवर दिसून येतो. साठवण सुविधांची कमतरता, थंडगार गोदामांचा अभाव आणि योग्य तोलमाप व्यवस्थेतील त्रुटी या समस्यांमुळेही शेतकऱ्यांना तोटा सहन करावा लागतो.

मध्यस्थांची संख्या जास्त असल्यामुळे शेतमालाला योग्य दर मिळत नाही. बाजारातील मागणी-पुरवठा तत्त्वानुसार दर बदलत असले तरी माहितीअभावी शेतकरी योग्य वेळी विक्री करू शकत नाहीत. त्यामुळे भौगोलिक परिस्थिती, बाजाररचना आणि पायाभूत सुविधांचा सखोल अभ्यास करून सुधारणा करणे आवश्यक आहे. एकूणच, लोणंद कृषिउत्पन्न बाजारसमितीतील शेतकऱ्यांच्या समस्यांचा भौगोलिक अभ्यास केल्यास त्यांच्या अडचणी समजून घेऊन योग्य नियोजन करता येईल व शेतकऱ्यांचे उत्पन्न वाढविण्यास मदत होईल.

1. प्रस्तावना:-

अगदी सुरुवातीच्या काळात मानव आपल्या अन्न, वस्त्र, निवा-याची गरज जंगलातून पूर्ण करत होता. त्यावेळी मानवाच्या गरजा अत्यंत मर्यादित होत्या. निसर्गाबद्दलच्या मानवाच्या वाढत्या ज्ञानाबरोबर मानवी सहजीवनही वाढत गेले, मानवी संस्कृतीचा विकास झाला. मानवाने शेती बरोबरच त्याचे जीवन सुकर करण्यासाठी इतर कलाही अवगत केल्या. काही लोक विशिष्ट प्रकारची कामे करण्यात तरबेज झाली. मानवाला आपल्या सर्व गरजा भागविण्यासाठी इतर लोकांनी केलेल्या कामावरही अवलंबून राहावे लागू लागले. यातूनच मानवाने देवाणघेवाणीची सुरुवात केली. मानवाच्या आर्थिक जीवनात प्रगती होवू लागली. विविध व्यवसायातून मानव अतिरिक्त उत्पादन मिळवू लागला. एकमेकांच्या विविध गरजा भागविण्यासाठी या अतिरिक्त उत्पादनात देवाणघेवाण सुरु झाली. म्हणजेच एक प्रकारे विनिमयाची सुरु झाली. सुरुवातीस हा विनिमय वस्तुच्या स्वरूपात होता. पूढे वस्तूविनिमय करण्यात अनेक अडचणी येवू लागल्या. या अडचणीवर मात करण्यासाठी पैशाचा वापर सुरु झाला पैशाच्या वापरामुळे खरेदी व विक्री व्यवहार सुरळीत होवून त्यांना मोठ्या प्रमाणात चालना मिळाली व बाजारपेठा अस्तित्वात आल्या.

सध्या आपणास आपल्या विविध गरजा भागविण्यासाठी जवळच्या बाजारातून विविध वस्तू आणाव्या लागतात. भू-पृष्ठरचना, हवामान, जमीन इ. सारख्या भौगोलिक घटकांच्या वितरणावर विविध वस्तूंचे उत्पादन अवलंबून असते. लोकांना या वस्तूंचा लाभ घेता यावा यासाठी या वस्तू विविध भागातून एकाच ठिकाणी विक्रीसाठी आणल्या जातात व बाजारपेठेचा विकास होतो. बाजारपेठेत विविध भागातून वस्तू येत असल्यामुळे वस्तू विक्रीमध्ये स्पर्धा निर्माण होवून वस्तूंच्या किंमती कमी राखल्या जावून या वस्तू ग्राहकाला योग्य किंमतीत मिळतात. प्रदेशाचा आणि तेथील बाजारपेठेचा विकास यांचा अत्यंत जवळचा संबंध आहे. त्यामुळे एखाद्या प्रदेशाच्या विकासाचा जर योग्य अभ्यास करावयाचा असेल व नियोजन करावयाचे असल्यास त्याला बाजारपेठेचा शास्त्रीय अभ्यास पूरक ठरतो.

बाजारपेठेत येणाऱ्या शेतकऱ्याची आर्थिक स्थिती, शैक्षणिक स्थिती, जीवनमान, त्यांच्या समस्या इत्यादींचा भौगोलिकदृष्ट्या अभ्यास केला तर बाजारपेठेशी संबंधित अनेक घटकांच्या समस्या स्पष्ट करून त्यांचे आकलन होवू शकेल तसेच त्या समस्यांवर योग्य उपायही योजना येईल व बाजारपेठेच्या विकासासाठी मदत होईल.

या दृष्टीने आम्ही लोणंद येथील आठवडी बाजारास भेट देवून तेथील शेतकऱ्यांच्या विविध समस्यांचा अभ्यास केला.

कार्यक्षेत्र

लोणंद हे गाव सातारा जिल्ह्याच्या उत्तरेस सातारा शहरापासून 60 कि.मी. अंतरावर आहे. पूणे-बंगलोर राष्ट्रीय महामार्ग क्रं. 48 पासून म्हणजेच खंडाळापासून या शहराचे अंतर केवळ 29 कि.मी. आहे. भौगोलिकदृष्ट्या हे गाव निरा नदीच्या बाजूला 7 किमीवर वसले आहे. लोणंद शहराच्या पश्चिमेला दर गुरुवारी आठवडी बाजार भरतो.

2. उद्दीष्टे-

सदर प्रकल्प अहवालाचे उद्दिष्ट लोणंद येथील आठवडी बाजारात येण्या-या शेतकऱ्यांचा भौगोलिक अभ्यास करणे हा आहे. यासाठी पुढील घटकांचा अभ्यास केला आहे.

1. शेतकऱ्यांच्या शैक्षणिक, सामाजिक व आर्थिक स्थितीचा अभ्यास करणे.
2. वाहतूकीची साधने, बाजारपेठेपासूनचे अंतर यांचा अभ्यास करणे.
3. बाजारपेठेत होणा-या आर्थिक उलाढालीचा अभ्यास करणे.
4. बाजारपेठेसाठी उपलब्ध असणारी जागा योग्य आहे का ते पाहून पर्यायी जागा सूचविणे.
5. शेतकऱ्यांच्या विविध समस्यांचा अभ्यास करणे.
6. शेतकऱ्यांच्या विविध समस्यांवर उपाय सूचविणे.

3. अभ्यासपद्धती

लोणंदच्या आठवडी बाजारात येणा-या 100 शेतकऱ्यांची रँडम पद्धतीने निवड करून प्रश्नावलीच्या साहाय्याने माहितीचे रूपांतर टक्केवारीमध्ये करून ही प्राथमिक माहिती उपयुक्त तक्ते व आलेखांच्या साहाय्याने दर्शविण्यात आलेली आहे.

4. अहवाल: -

बाजारपेठेमुळे ग्राहकाला त्याच्या विविध वस्तू व सेवा विषयक गरजांची पूर्तता करणे शक्य होते. त्याला इतर प्रदेशातील उत्पादित गोष्टींची उपलब्धता होते. त्यामुळे ग्राहक आपली गरज व क्षमता लक्षात घेवून आवश्यक वस्तू प्राप्त करून घेवू शकतो. बाजारपेठेच्या विकासामुळे ग्राहकांना आवश्यक असणा-या विविध वस्तूंचा पुरवठा योग्य किमतीत होतो. त्यामुळे त्यांची जीवनशैली बदलून राहणीमान सुधारण्यास मदत होते. बाजारपेठेमुळे प्रदेशाच्या आर्थिक विकासाला चालना मिळते. तसेच येथे विचार व संस्कृतीची देवाणघेवाण होवून समाज अधिक सहिष्णू व व्यापक दृष्टीचा बनतो. यामुळे समाजाची गतीशिलता वाढते. बाजारपेठेमुळे उत्पादकांना स्थैर्य मिळते. नवनवीन उद्योग स्थापन्यास मदत मिळते. गुंतवणूकीस चालना मिळते. याप्रकारे बाजारपेठा प्रदेशाच्या सर्वांगीण विकासास हातभार लावतात.

खंडाळा तालुक्यात खंडाळा, लोणंद, शिरवळ व वाठार या चार ठिकाणी आठवडी बाजार भरतो. यातील लोणंद येथे भरणारा आठवडी बाजार सर्वात मोठा असतो. त्यामुळे हा बाजार आम्ही अभ्यासासाठी निवडला या बाजारातील 100 शेतकऱ्यांचे सर्वेक्षण करून त्यांच्या विविध समस्या समजावून घेवून त्यावरील विविध उपाय शोधण्याचा आम्ही प्रयत्न केला.

4.1 शेतकऱ्यांचे लिंग व वयोगट: -

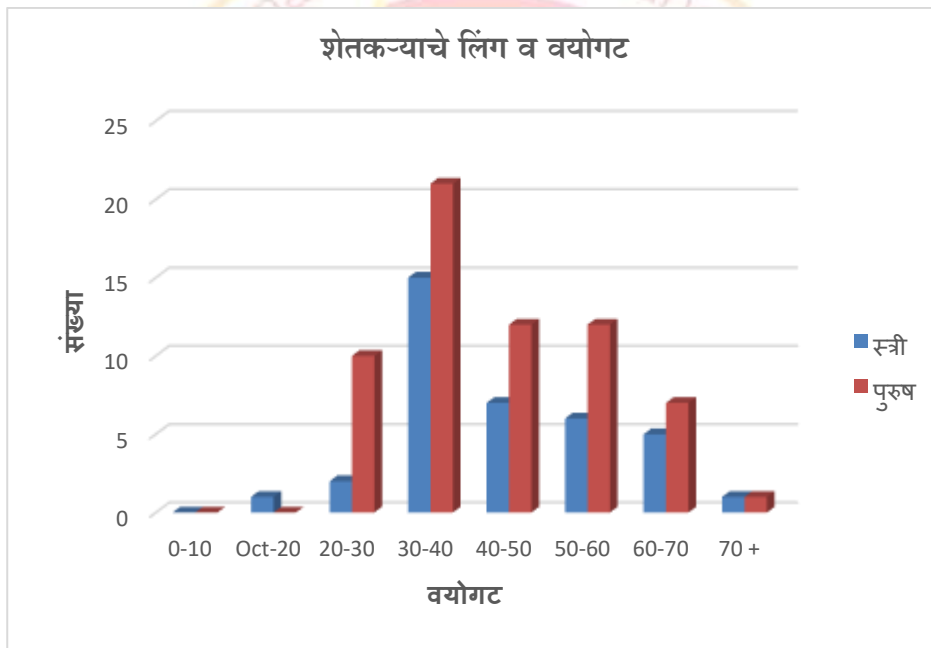
लोणंदच्या आठवडी बाजारात शेतमाल विकणाऱ्या 100 शेतकऱ्यांच्या अभ्यासावरून असे लक्षात आले की पुरुष शेतकऱ्यांची संख्या स्त्री शेतकऱ्या पेक्षा जास्त आहे. सर्वेक्षण केलेल्या एकूण शेतकऱ्यात 63 टक्के पुरुष व 37 टक्के स्त्रीया आहेत. एकूण शेतकऱ्यांपैकी 73 टक्के शेतकरी 30 ते 60 वयोगटातील आहेत 70 पेक्षा जास्त वयाचा व 20 पेक्षा कमी वयाचा केवळ एकच शेतकरी आढळला. 30 ते 40 या वयोगटातील स्त्री व पुरुष शेतकऱ्यांची संख्या सर्वात जास्त आहे. 10

ते 20 वयोगटाचा अपवाद वगळता इतर सर्व वयोगटात स्त्रीयांपेक्षा पुरुषाची संख्या जास्त आहे. याचा अर्थ लोणंदच्या आठवडी बाजारात व्यवसाय करणारे बहुतांश व्यावसायिक मध्यम वयाचे आहेत.

तक्ता क्र. 1 शेतकऱ्याचे लिंग व वयोगट

वय	स्त्री	%	पुरुष	%	एकूण	%
0-10	0	0	0	0	0	0
10-20	1	2.70	0	0	1	1
20-30	2	5.41	10	15.87	12	12
30-40	15	40.54	21	33.33	36	36
40-50	7	18.92	12	19.04	19	19
50-60	6	16.22	12	19.04	18	18
60-70	5	13.51	7	11.11	12	12
70 +	1	2.70	1	1.58	2	2
एकूण	37	100	63	100	100	100

स्त्रोत:- प्राथमिक माहिती



आकृती क्र 1 व्यावसायिकांचे लिंग व वयोगट

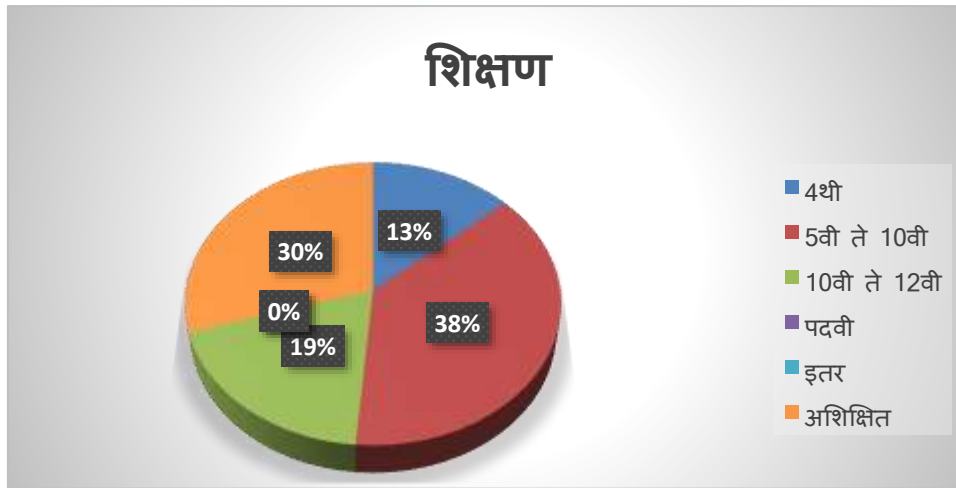
4.2 शेतकऱ्याची शैक्षणिक स्थिती: -

लोणंदच्या आठवडी बाजारात शेतमाल विकणाऱ्या शेतकऱ्यांपैकी 87 टक्के शेतकरी सुशिक्षित व 13 टक्के शेतकरी निरक्षर आहेत. निरक्षर शेतकऱ्यात 11 स्त्रिया व 2 पुरुष आहेत. 12 टक्के शेतकऱ्याचे शिक्षण केवळ चौथी पर्यंत झाले आहे. 47 टक्के शेतकऱ्याचे शिक्षण 10वी पर्यंत, 21 टक्के शेतकऱ्याचे शिक्षण 12वी पर्यंत तर केवळ 7 टक्के शेतकरी उच्च शिक्षित आहेत. एकूण स्त्री शेतकऱ्यांपैकी 29.73 टक्के शेतकरी अशिक्षित आहेत व शिक्षित सर्व महिला शेतकऱ्याचे जास्तीत जास्त 12वी पर्यंत शिक्षण झाले आहे. एकही महिला शेतकरी पदवीधर नाही. पुरुष शेतकऱ्याचा विचार करता केवळ 3.17 टक्के पुरुष शेतकरी अशिक्षित आहेत. 11.11 टक्के पुरुष शेतकरी पदवीधर आहेत. 74.60 टक्के पुरुष शेतकऱ्याचे शिक्षण 5वी ते 12वी पर्यंत झाले आहे. 11.11 टक्के पुरुष शेतकऱ्याचे केवळ 4थी पर्यंत एकंदरीत लोणंदच्या

बाजारपेठेत व्यवसाय करणारे बहुतांश व्यावसायिक सुशिक्षित असल्यामुळे येथील मालाचा दर्जा चांगला व किंमती योग्य आढळतात. तक्ता क्र. 2 शेतकऱ्यांची शैक्षणिक स्थिती

शिक्षण	स्त्री	%	पुरुष	%	एकूण	%
4थी	5	13.51	7	11.11	12	12
5वी ते 10वी	14	37.84	33	52.38	47	47
10वी ते 12वी	7	18.92	14	22.22	21	21
पदवी	0	0	7	11.11	7	7
इतर	0	0	0	0.00	0	0
अशिक्षित	11	29.73	2	3.17	13	13
एकूण	37	100	63	100.00	100	100

स्त्रोत : - प्राथमिक माहिती



आकृती क्र. 2 शेतकऱ्यांची शैक्षणिक स्थिती

4.3 शेतकऱ्याची जातीनुसार विभागणी:-

लोणंदच्या आठवडी बाजारात व्यवसाय करणा-या एकूण शेतकऱ्यांपैकी 87 टक्के शेतकरी हिंदू आहेत. 11 टक्के शेतकरी मुस्लिम आहेत. तर 2 टक्के शेतकरी बौद्ध आहेत. हिंदू शेतकऱ्याचा विचार करता जातीने मराठा व माळी समाजाचे शेतकरी इतरांच्या तुलनेने खूपच अधिक आहेत. एकूण 11 टक्के मुस्लिम शेतकऱ्यात केवळ 1 महिला व 10 पुरुष आहेत.

तक्ता क्र. 3 शेतकऱ्यांची जातीनुसार विभागणी

जात	स्त्री	%	पुरुष	%	एकूण	%
माळी	5	13.51	9	14.29	14	14
मुस्लिम	1	2.70	10	15.87	11	11
तेली	2	5.41	1	1.59	3	3
चर्मकार	0	0.00	2	3.17	2	2
ब्राम्हण	0	0.00	1	1.59	1	1

गोसावी	2	5.41	5	7.94	7	7
मराठा	13	35.14	17	26.98	30	30
रामोशी	2	5.41	0	0.00	2	2
मांग	2	5.41	3	4.76	5	5
कोलाटी	0	0.00	1	1.59	1	1
परिट	0	0.00	1	1.59	1	1
काशीकापडी	1	2.70	0	0.00	1	1
रजपूत	0	0.00	2	3.17	2	2
महार	3	8.11	0	0.00	3	3
धनगर	5	13.51	2	3.17	7	7
बौदध	0	0.00	2	3.17	2	2
ढोर	1	2.70	0	0.00	1	1
भोई	0	0.00	3	4.76	3	3
बुरुड	0	0.00	1	1.59	1	1
शिंपी	0	0.00	1	1.59	1	1
चांभार	0	0.00	2	3.17	2	2
एकूण	37	100.00	63	100.00	100	100

स्त्रोत:- प्राथमिक माहिती

4.4 शेतकऱ्याच्या व्यवसायाचा कालावधी:-

संशोधन केलेल्या एकूण शेतकऱ्यांपैकी 37 टक्के शेतकरी 15 वर्षांपेक्षा अधिक काळापासून लोणंदच्या आठवडी बाजारात शेतमाल विकत आहेत. 23 टक्के शेतकरी 10 ते 15 वर्षांपासून, 21 टक्के शेतकरी 5 ते 10 वर्षांपासून या बाजारात शेतमाल विकत आहेत. तर केवळ 19 टक्के शेतकऱ्यांनी गेल्या 5 वर्षात या बाजारात शेतमाल विकायला सुरुवात केली आहे. एकंदरीत या बाजारात बहुतांश शेतकरी 10 वर्षांहून अधिक काळापासून व्यवसाय करत आहेत. म्हणजेच हा बाजार पूर्वीपासूनच एक मोठा व महत्वाचा बाजार आहे.

तक्ता क्र. 4 शेतकऱ्याच्या व्यवसायाचा कालावधी

वर्षे	स्त्री	%	पुरुष	%	एकूण	%
1 ते 5	9	24.32	10	15.87	19	19
5 ते 10	9	24.32	12	19.05	21	21
10 ते 15	7	18.92	16	25.40	23	23
15पेक्षा जास्त	12	32.43	25	39.68	37	37
एकूण	37	100.00	63	100.00	100	100

स्त्रोत:- प्राथमिक माहिती

4.5 शेतकऱ्याच्या ठिकाणाचे बाजारापेठेपासूनचे अंतर: - संशोधन केलेल्या एकूण शेतकऱ्यांपैकी 60 टक्के शेतकरी हे लोणंद शहरातीलच आहेत. 30 टक्के शेतकरी खंडाळा तालुक्यातील विविध गावातून केवळ शेतकरी शेतमाल विकण्यासाठी या बाजारात आले आहेत. तर 10 टक्के शेतकरी खंडाळा तालुक्याच्या बाहेरून या बाजारात शेतकऱ्यांसाठी आले आहेत. याचाच अर्थ लोणंद येथील आठवडी बाजार लोणंद शहराव्यतिरिक्त इतर भागातील लोकांनाही रोजगाराची संधी प्राप्त करून देत आहे.

तक्ता क्र. 5 शेतकऱ्याच्या ठिकाणाचे बाजारापेठेपासूनचे अंतर

गाव	स्त्री	%	पुरुष	%	एकूण	%
लोणंद	19	51.35	41	65.08	60	60
लोणंद बाहेरील	14	37.84	16	25.40	30	30
खंडाळा तालुक्याच्या बाहेरील	4	10.81	6	9.52	10	10
एकूण	37	100.00	63	100.00	100	100

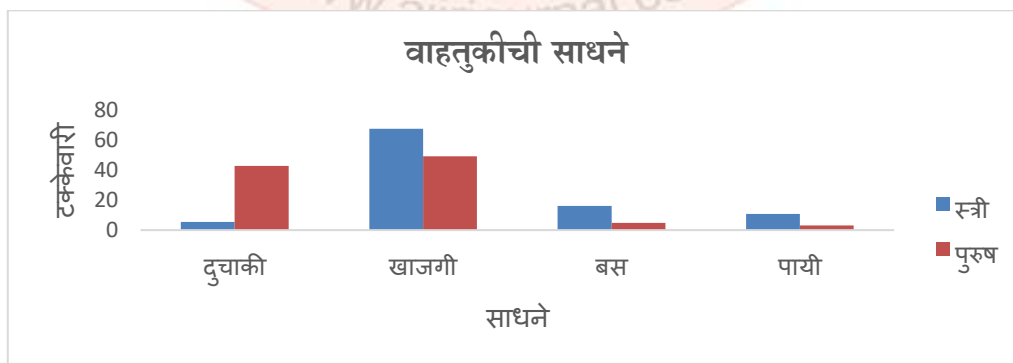
स्त्रोत:- प्राथमिक माहिती

4.6 शेतकऱ्याकडून बाजारपेठेत येण्यासाठी वापरण्यात येणारी वाहतुकीची साधने:- संशोधन केलेल्या एकूण शेतकऱ्यांपैकी 56 टक्के शेतकरी खाजगी वाहनाने बाजारपेठेपर्यंत येतात. 29 टक्के शेतकरी स्वतःच्या दुचाकीने बाजारात येतात. 9 टक्के शेतकरी एस्. टी. बसने बाजारात येतात. तर केवळ 6 टक्के शेतकरी पायी बाजारात येतात. बसने बाजारात येणा-या शेतकऱ्यांचे प्रमाण कमी आहे. कारण बसमध्ये गर्दीमुळे माल चढवणे, उतरविणे अवघड जाते. तसेच स्टँडपासून बाजारपेठेपर्यंत मालाची वाहतूक करणे त्रासदायक व खर्चीक असते. तसेच गावापर्यंत योग्य वेळेत बस मिळत नाही. यामुळे बहुतांश शेतकरी खाजगी वाहनाने आपला माल घेवून बाजारपेठेपर्यंत येतात व परत आपल्या घरी जातात. दुचाकीवर येणारे बहुतांश शेतकरी लोणंद शहरातील किंवा आजूबाजूच्या गावातील आहेत. यात 27 पुरुष व केवळ 2 स्त्री शेतकऱ्यांचा समावेश होतो. पायी येणारे शेतकरी हे लोणंद शहरातीलच आहेत. बसने येणारे शेतकरी हे बहुतांश दूर अंतरावरून किंवा तालुक्याबाहेरून या बाजारात शेतमाल विकण्यासाठी येतात.

तक्ता क्र. 6 व्यावसायिकांकडून बाजारपेठेत येण्यासाठी वापरण्यात येणारी वाहतुकीची साधने

वाहतुकीचे साधन	स्त्री	%	पुरुष	%	एकूण	%
दुचाकी	2	5.41	27	42.86	29	29
खाजगी	25	67.57	31	49.21	56	56
बस	6	16.22	3	4.76	9	9
पायी	4	10.81	2	3.17	6	6
एकूण	37	100.00	63	100.00	100	100

स्त्रोत:- प्राथमिक माहिती



आकृती क्र 4 शेतकऱ्याकडून बाजारपेठेत येण्यासाठी वापरण्यात येणारी वाहतुकीची साधने

4.7 व्यावसायिकांवरील कर्ज:- संशोधन केलेल्या एकूण 100 शेतकऱ्यांपैकी 58 टक्के शेतकऱ्यांवर कोणतेही कर्ज नाही. या आठवडी बाजारात व्यवसाय करण्या-या 81.08 टक्के स्त्री शेतकऱ्यांवर कोणतेही कर्ज नाही. तर 44.44 टक्के पुरुष शेतकऱ्यांवर ही कर्ज नाही. 10,000 पेक्षा जास्त कर्ज असणा-या शेतकऱ्यांचे प्रमाण 28 टक्के इतके आहे. शेतकऱ्यांनी घेतलेली कर्जे प्रामुख्याने त्यांच्या शेती कारणांसाठी कमी मुदतीची होती. ही कर्जे प्रामुख्याने पतसंस्था, खाजगी सावकार/हात उसणे या प्रकारची होती.

तक्ता क्र. 7 शेतकऱ्यांवरील वरील कर्ज

कर्ज	स्त्री	%	पुरुष	%	एकूण	%
नाही	30	81.08	28	44.44	58	58
होय	0	0.00	5	7.94	5	5
0-1000	0	0.00	0	0.00	0	0
1000-5000	0	0.00	3	4.76	3	3
5000-10000	2	5.41	4	6.35	6	6
10000 पेक्षा जास्त	5	13.51	23	36.51	28	28
एकूण	37	100.00	63	100.00	100	100

4.8 शेतकऱ्यांनी बाजारपेठेत भरलेला कर:-

गुरुवारच्या आठवडी बाजारात शेतमाल विकणासाठी शेतकऱ्यांच्या लोणंद नगर परिषदेस काही कर भरावा लागतो. 51 टक्के शेतकरी 11-20 रु कर भरतात. 25 टक्के शेतकरी 10 रु पेक्षा कमी कर देतात. 16 टक्के शेतकरी 21-30 रु कर भरतात. तर 7 टक्के शेतकरी 31-50 रु कर भरतात. 100 रु पेक्षा जास्त कर भरणाऱ्या केवळ एकच शेतकरी आढळला.

तक्ता क्र. 8 शेतकऱ्यांनी बाजारपेठेत भरलेला कर

कर	स्त्री	%	पुरुष	%	एकूण	%
01-10	10	27.03	15	23.81	25	25
11-20	21	56.76	30	47.62	51	51
21-30	4	10.81	12	19.05	16	16
31-40	1	2.70	1	1.59	2	2
41-50	1	2.70	4	6.35	5	5
51-100	0	0.00	0	0	0	0
100 पेक्षा जास्त	0	0.00	1	1.59	1	1
एकूण	37	100.00	63	100	100	100

स्त्रोत:- प्राथमिक माहिती

4.9 शेतकऱ्यांना होणारा त्रास: -

संशोधन केलेल्या 100 शेतकऱ्यांपैकी बाजाराच्या ठिकाणी आम्हांस कोणताही त्रास नाही असे मत 41 टक्के जणांनी नोंदविले. 18 टक्के शेतकऱ्यांना दुर्गंधी धूळ व धूर यामुळे तसेच आवाजामुळे होणा-या प्रदुषणाचा त्रास होत आहे. 8 टक्के शेतकऱ्यांना बाजारातील गाड्यांमुळे त्रास, जागेची अडचण, पिण्याचे पाणी बाजारात उपलब्ध नसल्यामुळे गैरसोय होत आहे. याशिवाय स्वच्छता गृहाची सोय अपुरी असल्यामुळे, अतिक्रमण इत्यादी मुळे ही शेतकऱ्यांना त्रास होतो. तसेच कोणताही त्रास नाही म्हणणारे सुद्धा 41 टक्के शेतकरी बाजारात आढळून

तक्ता क्र. 9 बाजारपेठेत शेतकऱ्यांना होणारा त्रास

होणारा त्रास	स्त्री	%	पुरुष	%	एकूण	%
जागेची अडचण	4	10.81	4	6.35	8	8
पिण्याचे पाणी	3	8.11	5	7.94	8	8
प्रदुषण	8	21.62	10	15.87	18	18
स्वच्छतागृह	2	5.41	1	1.59	3	3
गाड्या	3	8.11	5	7.94	8	8
अतिक्रमण	2	5.41	1	1.59	3	3
कोणताही नाही	7	18.92	34	53.97	41	41
इतर	8	21.62	3	4.76	11	11
एकूण	37	100.00	63	100.00	100	100

स्त्रोत:- प्राथमिक माहिती

4.10 बाजाराच्या ठिकाणबाबत शेतकऱ्यांचे मत: -

संशोधन केलेल्या एकूण 100 शेतकऱ्यांपैकी 94 टक्के शेतकऱ्यांना सध्याचे बाजाराचे ठिकाण योग्य वाटते आहे. तर केवळ 6 टक्के शेतकऱ्यांना सध्याचे ठिकाण अयोग्य वाटत आहे. यात 5 स्त्री शेतकरी व 1 पुरुष शेतकरी आहे.

तक्ता क्र. 10 बाजाराच्या ठिकाणबाबत शेतकऱ्यांचे मत

बाजाराचे ठिकाण	स्त्री	%	पुरुष	%	एकूण	%
होय	32	86.49	62	98.41	94	94
नाही	5	13.51	1	1.59	6	6
एकूण	37	100.00	63	100.00	100	100

स्त्रोत:- प्राथमिक माहिती

5. निष्कर्ष व उपाय: -

अ) निष्कर्ष:-

- लोणंदच्या आठवडी बाजारामध्ये व्यवसाय करणा-यामध्ये पुरुष शेतकऱ्यांचे प्रमाण स्त्री शेतकऱ्यांपेक्षा दुप्पटीने जास्त आहे.
- 30 ते 40 या वयोगटातील स्त्री व पुरुष शेतकऱ्यांची संख्या सर्वाधिक आहे.
- लोणंदच्या बाजारपेठेत शेतमाल विकणाऱ्या एकूण शेतकऱ्यांपैकी 87 टक्के शेतकरी सुशिक्षित/साक्षर आहेत.
- लोणंदच्या आठवडी बाजारातील 87 टक्के शेतकरी हिंदू, 11 टक्के मुस्लिम व 2 टक्के बौद्ध आहेत.
- लोणंदच्या आठवडी बाजारात शेतमाल विकणाऱ्या शेतकऱ्यांपैकी 60 टक्के शेतकरी या ठिकाणी हाच व्यवसाय 10 वर्षा पेक्षा अधिक कालावधीपासून करत आहेत.
- लोणंदच्या आठवडी बाजारात शेतमाल विकणाऱ्या 90 टक्के शेतकरी हे खंडाळा तालुक्यातीलच आहेत.
- खंडाळा तालुक्याबाहेरून शेतमाल विकणाऱ्या लोणंदच्या आठवडी बाजारात येणा-या शेतकऱ्यांची संख्या 10 टक्के आहे.
- संशोधन केलेल्या एकूण शेतकऱ्यांपैकी 65 टक्के शेतकरी बाजारात येण्यासाठी खाजगी वाहनांचा व बस चा वापर करतात.
- या बाजारपेठेतील 58 टक्के शेतकऱ्यांवर कोणतेही कर्ज नाही.

10. शेतकऱ्यांवर असणारे कर्जाचे प्रमाण कमी आहे.
11. बाजारपेठेमधील शेतकऱ्यांवरील कर त्यांच्या एकूण व्यवसायाच्या मानाने अत्यंत कमी आहे.
12. 41 टक्के शेतकऱ्यांना या बाजारपेठेत कोणताही त्रास होत नाही.
13. लोणंदच्या बाजारपेठेत प्रामुख्याने प्रदुषण, गाड्यांचा अडथळा, पिण्याच्या पाण्याची गैरसोय यासारखे त्रास जाणवतात.
16. 94 टक्के शेतकऱ्यांना सध्याचे बाजाराचे ठिकाण योग्य वाटते.

उपाय:- लोणंदच्या बाजारातील शेतकऱ्यांचे समस्यांवरील उपाय.

1. लोणंदच्या बाजारात व्यवसाय करणा-या व्यावसायिकांपैकी 37 टक्के स्त्रीया आहेत. त्यांना बाजारपेठेत येण्यासाठी खाजगी वाहन वापरावे लागते. कारण माल बस स्टँड पासून बाजारापर्यंत वाहून नेणे खर्चीक व कष्टदायक आहे. त्यामुळे बाजाराचे ठिकाण एस्.टी. स्टँडजवळ असावे.
2. बहुतांश व्यावसायिकांना रात्री परत जाण्यासाठी बसेस नसल्यामुळे खाजगी वाहन वापरावे लागतात. म्हणून बाजारात दिवशी एस्.टी. वेळापत्रकात बदल करून व्यावसायिकांची सोय करावी.
3. सध्याच्या बाजाराच्या ठिकाणी काही जागा अपरिहार्य पणे बाजारातून वाहन घालावे लागते इतर वाहतुकीस अडथळा होणार नाही अशी बाजाराची जागा निवडल्यास गाड्यांमुळे होणा-या त्रासाची समस्या कमी होईल.
4. बाजारातील कचरा केवळ सायंकाळी उचलला जातो. त्या ऐवजी दर 2-3 तासानी बाजाराच्या दिवशी बाजारातील कचरा उचलावा त्यामुळे प्रदुषण होणार नाही.
5. बाजाराच्या दिवशी जवळ पास फिरती स्वच्छतागृहे उभारावी.
6. बाजाराच्या दिवशी नगर पालिकेने पिण्याच्या स्वच्छ पाण्याची स्वतंत्र सोय करावी.
7. शेतकऱ्यांना होणा-या उन्हाचा त्रास कमी करण्यासाठी कायम स्वरूपी शेड उभारण्याचा प्रयत्न करावा.
8. बाजारात अरुंद रस्त्यावर भरत असल्याने गर्दीचाही त्रास होतो. त्यामुळे गर्दी टाळणे / नियमित करणे शक्य होईल अशा ठिकाणी बाजार भरवावा.
9. शेतकऱ्यांना नगरपालिकेने उत्तम जेवणाची सोय करावी.

6. संदर्भग्रंथ: -

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Global Climate Change and Vision *Viksit Bharat*: Challenges and Developmental Alternatives**Dr. Bhimashankar M. Birajdar**

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E-mail: bmbirajdar83@gmail.com**Abstract:**

During contemporary times global climate change is one of the biggest challenges confronting humankind. It seems that the phenomenon of climate change has been adversely influencing because of frequent natural calamities, reduction in agricultural productivity, health risks, migration, adaptation and growth in unemployment. The threats of global climate changes and their implications are not only restricted to a particular continent or region but cross trans-national physical and geographical boundaries. Keeping in mind the scope and limitations of this paper, impacts of global climate change have been delineated, exposed and attempted to find appropriate alternatives in the context of a transformative agenda set by the Government of India i.e. Viksit Bharat by 2047. This paper is a sincere endeavour to understand the challenges and find out appropriate measures and alternatives to tackle the contemporary predicament concerned with climate change by adopting sustainability in developmental models and paradigms. It would play a pivotal role in the trajectory of achieving the goal of making India a Viksit Bharat by 2047. Simultaneously, by adopting transformative agenda and innovative ideas concerned with global climate change and environmental crisis this article will further strengthen the environmental and ecological consciousness.

Key-Words: 'Natural Calamities', 'Agricultural Productivity', 'Health Risk', 'Migration', 'Adaptation', 'Unemployment', 'Sustainability', 'Viksit Bharat' 'Environmental and Ecological Consciousness'.

* This paper is an outcome of 'Minor Research Project' funded by the Shivaji University, Kolhapur (Maharashtra) under 'Diamond Jubilee Research Initiation Scheme' (2023-25).

Introduction:

"Climate change has endangered our future. It will produce stupendous changes in our lives. A calamity is confronting us. It will continue to become more and more monstrous. Our generation has realized this and is distressed by it. We youngsters are not fully aware of the management and the system, but we would like to change this situation" – Greta Thunberg (School Girl from Sweden who led the movement popularly known as 'Friday for Future') (Ref. Deshpande Madhukar, 'Greta Calling, Can You Hear Me? Pune: Manovikas Prakashan, 2021)

Today, the human world is standing at a crucial juncture of its development. The global environmental crises have confronted human communities along with development in the last century. Global climate change is one of the biggest challenges confronting humankind in contemporary times. The threats of global climate change and their implications are not only restricted to a particular continent or region but cross transnational physical and geographical boundaries. (Gajendragadkar, 2022:471). Global climate change is a major and central theme of environmental history because the field studies the mutual, long-term relationships and reciprocal influences of human societies and nature over time. This includes how human actions have altered the global climate system and how those changes, in turn, have shaped human history and society. Environmental history is an important subject that can help us to learn from past human mistakes and overcome environmental problems in future (Patil Avanish, et al., 2024:06).

Challenges of Global Climate Change:

The term '*climate change*' refers to a change in the longer-term pattern of behaviour of the atmosphere over millennia or, more recently, as a result of natural processes or human activities. Climate is distinguished from weather, which is the specific behaviour of the climate at a particular time. The terms global warming and climate change sometimes seem to be used interchangeably. Global warming is just one feature of climate change and is indeed an important indicative parameter of climate change. Small rises in average global temperatures can further lead to very large changes in other aspects of local and global climatic patterns. In the 21st Century, global climate change is one of the most serious crises, problems confronting humankind. The human world is standing at a crucial position in the pace of development. Never before have entire natural resources across the globe have the threat of its depletion. Hence, a widespread notion prevailed that no resource is finite and within its existence, the developmental models should be encouraged which maintains environmental and ecological equilibrium. Climate change and global warming are wide-ranging and profoundly influencing almost all dimensions of human societies. The climate change issue is part of the larger challenge of sustainable development. As a result, climate policies can be more effective when consistently rooted within broader strategies designed to make national and regional development pathways more sustainable. The impact of climate variability and change, climate policy responses, and associated socio-economic development will affect the ability of countries to achieve sustainable development goals. The pursuit of these goals will in turn impact on the developmental policies (Sathaye et al., 2006:314). In brief, global climate change is a broad concept denoting changes in temperature, rainfall, storms or in any forms of atmosphere (Gajendragadkar, 2022:255). The world agrees that global warming has been brought about by humans (Ramesh, 2018: 16). The developmental policies of the government are generally implemented under the pressure of industrialists, corporate firms. Hence, the government started opposing such kinds of environmental movements (Godbole Achyut, 2020: 201).

Global Climate Change and its Linkages with Vision *Viksit Bharat- 2047*:

The vision of *Viksit Bharat* by 2047 emphasizes the critical importance of sustainable development, advocating for a harmonious balance between economic growth and environmental stewardship. The vision prioritizes the adoption of green technologies, renewable energy sources, and eco-friendly practices across various industries to minimize the environmental footprints. The initiative aims to accelerate the transition to clean energy, such as solar, wind, and hydroelectric power while promoting energy efficiency and reducing reliance on fossil fuels. Stricter environmental regulations and the enforcement of conservation policies will be key to safeguarding India's rich biodiversity and natural resources. The vision also stresses the need for innovative solutions in waste management, water conservation, and pollution control to ensure a cleaner, healthier environment (Cited in Mohapatra, S., and Pohit, S. 2024). Additionally, the protection of forests, wildlife, and natural habitats will be central to the country's sustainability efforts. By promoting circular economy principles and encouraging responsible consumption, *Viksit Bharat* by 2047 aims to create an environmentally resilient India, ensuring that natural resources are preserved for the benefit of future generations while achieving economic and social progress (Dan Ishwar, 2024: 53-58).

India and in Maharashtra as well experiencing thousands of experiments that simultaneously involve local communities and their ecosystems in environmentally friendly, equitable, and participatory development initiatives. In Western Maharashtra liberation movements tried to build up struggles and equitable water distributions, management of natural resources and drought relief. It organized people to put pressure on the government to implement those options. In the 1980s, Shankar Guha Niyogi brought forward the need for struggle and reconstruction to go hand in hand in the movement. The organization 'Navdhanya' was started in Uttarakhand and has now spread too many states. This organization has done foundational work in the areas of biodiversity, local seeds, eco-friendly agriculture and local food grains. The Sukhomajri villages in Haryana became a good example of the 'cyclical development system' of eco-friendly development. Ralegansiddhi and Hiware Bazar in Maharashtra became good examples of micro-scale watershed development and water management. The Pani Panchayat in Pune district brought forward the issue of equitable water distribution. The organization 'Tarun Bharat Sangh' created water security in the

Arvari river basin in Alwar district. For this, they built *johads* (small water tanks) and small dams and revived the Arvari river. The policy for joint forest management was developed based on the experiences of the *Van Panchayat* in Uttarakhand and the *Arvari* model in West Bengal.

A tribal village in Gadchiroli district of Maharashtra, Mendha Lekha Farming, a direct link between the village grain bank, consumer producers and public distribution of local produce, declared that 'Our government in Mumbai-Delhi, our government in our village' and demonstrated what can be achieved through tribal self-governance and protection of forests. Deccan Development Society revolutionized agriculture in Medak district of Telangana by linking it with eco-friendly services, Kutavakkam village in Tamil Nadu adopted the concept of '*Gram Swaraj*' and became an example of a decentralized, environmentally sensitive and regenerative economy. Masanobu Fukuoka, a Japanese philosopher and agriculturalist/farmer, 'One Straw Revolution' (1978) and Shri. A. Dabholkar from the network of '*Prayog Parivar*' ground-breaking work and the work of Bhaskar Save in Gujarat, inspired many civic organizations to experiment with alternative agronomic practices and develop a different approach to agriculture. In their book 'Banking on Biomass: A New Strategy for Sustainable Prosperity' is based on 'Renewable Energy and Dispersed Industrialization (1997)', K. R. Date, Suhas Paranjpe and K. J. Joy has shown that we can create an agro-industrial society that is free from fossil fuels and energy, and that will provide environmentally friendly prosperity for all. In the book '*Alternative Futures: India Unshackled*' (edited by Ashish Kothari and K. J. Joy), 50 authors who have done groundbreaking work in their respective fields have said that we can dream of a different India that is politically and socially egalitarian, democratic, environmentally friendly, economically egalitarian, non-exploitative, socio-culturally diverse and harmonious. Among all these and thousands of similar experiments and experiences, there are some fundamental principles that are essential for development should be implicated wherever feasible from global, national, regional and local levels (Joy K. J., 2023: 365).

Global Climate Change and Developmental Alternatives concerned with vision *Viksit Bharat*:

- 1) The utilization of appropriate technology should be locally adaptable, eco-friendly, resource-efficient and culturally suitable. It mostly implicates local resources and labour. In fact it is assumed that indigenous technologies are more conducive, cost-effective and sustainable. Nature is often taken as a model, using the natural conditions of that concerned region as its components which is known as design with nature. It is also postulated that technology should use minimal resources and produce less waste.
- 2) The concept of 'Reduce', 'Reuse', and 'Refuse' and 'Recycle' approach indicates the much needed sustainability. These four 'R' perspectives encourage us towards minimum utilization of natural resources by using again and again rather than dumping or passing it as waste materials. Most importantly recycling the materials goes a long process or way in striving and achieving the aims or objectives of sustainability. It minimizes pressure on natural resources as well as reducing the problems of waste disposal and air, water, soil pollution (Kausik, 2004:162-63).
- 3) In the Earth Summit (1992) held at Rio-de-Janeiro (Brazil) the principles of sustainable development had been incorporated and formulated the agenda of outlining a 'global partnership for sustainable development'. This crucial document addresses wider ranges of environmental and developmental dimensions. It was intended to provide a strategy for implementing sustainable development throughout the world. The delegates of Earth Summit set up the UN Commission on Sustainable Development (CSD) in 1992 for monitoring and promoting the recommendations of the summit (Carter, 2007: 208).
- 4) 'Green Technology' or Environment Friendly Technology: There is generally assumed definition of Green Technology' or 'Environment Friendly Technology' is 'Technological elements in any production, gadgets or appliances which are taking into consideration environmental impacts as an indispensable components, designed and developed environmentally advantageous and harmless for

maintaining balance between development and environment'. It's advantageous, harmless for maintaining balance with the environment'. In fact, impacts on the environment of green technologies are considered as positive impact, neutral impact and negative impact. History of human endeavour contains innumerable phenomena or events of mankind's failure to live within physical limits. However, its success in overcoming constraints creates the cultural ethos of many dominant people across the world. Over the past three hundred years, mankind has demonstrated a grandest record of pushing back the explicit limits of population and economic growth by a series of remarkable technological progress and advancement. Since the recent history of a larger portion of human society has been consistently successful. It is probably a natural tendency that many people's aspirations are technological advancements with indefinite physical growth. They have envisaged the technological tools as integral and indispensable components for the future (Meadows et al., 1972: 129-30).

- 5) 'Eco-Tourism': An Alternative and Sustainable Model for Development: The plenty of natural resources, biodiversity or any other bountiful nature can be transformed into a sustainable alternative model of development. In fact, tourism is one of the fastest growing industries worldwide therefore; on the developmental approach of tourism in which substantial potentiality would be enhanced in vast natural areas. Ecotourism has been defined as "Tourism and recreation that is both nature-oriented and sustainable" (Sinha, 2012: 109). It consists of trips to relatively undisturbed natural areas for the specific purposes of studying, observing or enjoying the surroundings, wildlife as well as any manifestations of past or present culture to be found in these areas (*Ibid*:149-50). Ecotourism is sustainable nature based tourism that helps to preserve the environment and ecology. World Tourism Organisation (WTO), an apex body for development of tourism in the world defines, "Ecotourism is a tourism that involves travelling to relatively undisturbed natural areas with the specified objective of studying, admiring and enjoying the scenery and its wild plants and animals as well as existing cultural aspects (both past and present) found in these areas". The key elements for ecotourism are involvement of the local community, activation of financing resources and realising the environment resources. It is concerned with the protection of the environment in the pace of economic development (Joshi, 2014:151-68).
- 6) In the new-liberal, capitalistic economic system, not only India but all must place the highest priority on the sustainability of the planetary ecosystem and the future generations. This necessitates thinking of the planet as our common home, and not one made of national boundaries. The United Nations Development Programme (UNDP) framed a set of 17 Sustainable Development Goals (SDGs) for all nations. India has committed itself to this programme and the task of implementing the SDGs is assigned to the *Niti Ayog*. There are 17 goals spread across social welfare, economics and politics, however, many of them requisite changes in the existing economic system, natural resources planning and management for sustainable development (Nulkar, 2021:133-40).
- 7) On 12th April 2001 political parties across the world having naturalist backgrounds formed an informal association at Canberra (Australia). At that time these parties prepared '*Global Green Charter*' comprising major 6 guiding principles namely environmental wisdom, social justice, participatory democracy, non-violence, sustainability, reverence for biodiversity. Among these principles, the first four principles are related to global green politics. Therefore, there should be active, vibrant green political parties in developing countries like India. These parties should play a significant role in the trajectory of *Viksit Bharat* (Shintre, 2018:91-92).

It is need of an hour to retrospect and implement alternative developmental framework for the tackling the climate crisis during present times and future which should include **five basic principles**. They are as follows:

1. Ecological Integrity and Resilience:

Conservation of nature and its diversity, preservation of ecosystem processes and respect for their limits, adherence to ecological ethics in all human activities.

2. Social Health and Social Justice:

Meaningful life, non-discrimination between different communities and individuals, religious/caste harmony, social relations free from exploitation and discrimination.

3. Direct and Representative Democracy:

It begins by delegating decision-making to the smallest unit of human existence, so that every person can participate meaningfully. Also, by making the higher levels of governance in institutions accountable to the lower levels.

4. Economic Democracy:

Local people and individuals control the means of production, distribution, exchange, and markets. Adopting the path of localization to meet basic needs and building trade on it. Replacing private property with public and collective ownership.

5. Cultural Diversity and Democracy:

There should be linkages with cultural diversity with democratic values, ethos in knowledge acquisition: ways of living as well as in thought (Joy K. J., 2023: 366).

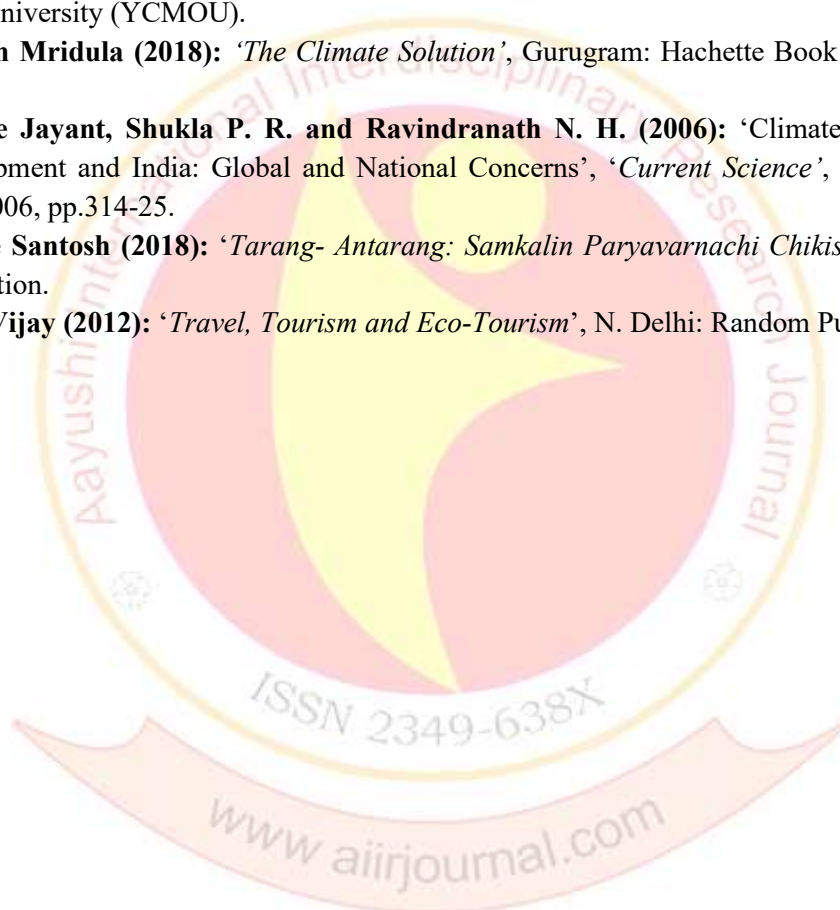
Conclusion:

The threats of global climate change are not restricted to the natural calamities occurring in a particular region or country but as discussed above it has global adverse implications. In the 21st-century Global climate diplomacy, adoption of sustainable development models with cooperation from all developing, developed and underdeveloped countries is required to tackle contemporary problems. As far as developing countries like India are concerned, renaming the ministry of environment and forest as climate change by the union government and other state governments is not adequate. At regional levels also there should be coordination between all stakeholders concerned with climate change, mitigation, adaptation strategies for finding feasible developmental alternatives. Climate change as one of the biggest challenges in the pace of development, the government should set up strategic mechanisms, willpower for rigorous implementation of environmental and ecological laws, regulations and encourage sustainable development practices, models for addressing adverse implications and creating environmental and ecological consciousness, climate change literacy and sustainable exposure in public media for Vision 'Viksit Bharat' by 2047.

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विकसित भारतासाठी पर्यटनाचे दृष्टिकोन

डॉ. अजितकुमार दादासो जाधव

इतिहास विभाग प्रमुख

आर्ट्स कॉमर्स अँड सायन्स कॉलेज,

नागठाणे ता. जि. सातारा.

प्रस्तावना-

भारत हा देश विविध संस्कृती, परंपरा, भाषा, ऐतिहासिक वारसाने समृद्ध असा देश आहे. प्राचीन कालखंडापासून आजपर्यंत व्यापार, शिक्षण, धार्मिक यात्रा, सांस्कृतिक देवाणघेवाण या माध्यमातून पर्यटन होत आले आहे. या पर्यटनास हातभार लावण्याचे काम समकालीन राजसत्ताधीशानी केले होते. आधुनिक काळात दळणवळण, संदेशवहनाच्या झालेल्या सोयी सुविधा आणि तंत्रज्ञानाचा विकास यामुळे जग जवळ येऊ लागले आणि यातून जागतिक पर्यटन वाढीस लागले आहे. विकसित भारत ही संकल्पना रुजवण्यासाठी पर्यटन क्षेत्र त्यास निश्चितच पूरक ठरेल. शाश्वत पर्यटन, सर्वसमावेशक पर्यटन, सांस्कृतिक व वारसा पर्यटन, ग्रामीण व कृषी पर्यटन तसेच डिजिटल पर्यटन असे विविध दृष्टिकोन भारताच्या पर्यटन धोरणात समाविष्ट झालेले करण्यात आले आहेत. म्हणून विकसित भारताच्या ध्येयपूर्तीसाठी पर्यटनाच्या विविध दृष्टिकोनांचा अभ्यास करणे आवश्यक ठरते. या अनुषंगाने सदर शोधनिबंधात विविध दृष्टिकोनाची चर्चा केली आहे.

संशोधनाची उद्दिष्टे-

1. भारतातील पर्यटन विकासाचे ऐतिहासिक संदर्भ अभ्यासणे.
2. शाश्वत पर्यटन, सर्वसमावेशक पर्यटन, सांस्कृतिक व वारसा पर्यटन, ग्रामीण व कृषी पर्यटन आणि डिजिटल पर्यटन या विविध दृष्टिकोनांचे विश्लेषण करणे.

विकसित भारतासाठी पर्यटनाचे दृष्टिकोन-

शाश्वत पर्यटन -

भारताच्या अनुषंगाने शाश्वत पर्यटन दृष्टिकोनाचा विचार केला असता प्राचीन संदर्भ आणि प्राथमिक ऐतिहासिक साधनांचा अभ्यास महत्त्वाचा ठरतो. शाश्वत पर्यटन ही आधुनिक संकल्पना असली तरी त्याचा मूळ गाभा हा भारतीय परंपरेमध्ये पाहायला मिळतो. ऋग्वेद, अथर्ववेद अशा वैदिक ग्रंथांमधून निसर्ग पूजा, जलसंवर्धन यासाठी प्रयत्न केल्याचे दिसून येते. यामुळे पर्यावरणाशी सुसंगत असे शाश्वत पर्यटन यातून विकसित होत गेले. इसवी सन पूर्व तिसऱ्या शतकातील सम्राट अशोकाच्या शिलालेखांमधून प्राणी संवर्धन, वृक्षारोपण, प्रवाशांसाठी विश्रांती गृहाची उभारणी केल्याचे उल्लेख मिळतात.¹ ह्यु एन त्संग, इब्नबतूता यासारख्या परकीय प्रवाशांनी आपल्या प्रवास वर्णनातून भारतातील धार्मिक व सांस्कृतिक स्थळांचे महत्त्व विशद केले आहे.² मध्ययुगीन काळात शेरशहा सुलताना बरोबरच इतर सत्ताधीशानीही प्रवाशांसाठी सोयी सुविधा आणि सरायांची निर्मिती केल्याचे उल्लेख मिळतात.³ शिलालेख, ताम्रपट, वास्तु अवशेष, प्रवासवर्णने, जुने ग्रंथ यामधून आपणास लोहस्तंभ, अजंठा, वेरूळ, खजुराहो लेणी, किल्ले इत्यादी सांस्कृतिक वारसा जतनाचे पुरावे मिळतात. पर्यटन व्यवस्थेविषयी माहिती मिळते. यावरून आपणास असे दिसून येते की, भारतात पर्यावरण संवर्धन, सांस्कृतिक जतन आणि प्रवाशांना सोयी सुविधा देण्याची परंपरा होती.

आधुनिक कालखंडात भारतात शाश्वत पर्यटन दृष्टिकोन हा या ऐतिहासिक परंपरेचा धोरणात्मक विस्तार मानला जातो. संयुक्त राष्ट्र शैक्षणिक, वैज्ञानिक आणि सांस्कृतिक संघटनेच्या (UNESCO) मते, वारसा स्थळ व्यवस्थापन आराखडा, पर्यटक संख्या मर्यादा आणि स्थानिक समुदायाचा सहभाग हे शाश्वत पर्यटनाचे मूलभूत घटक आहेत. त्यामुळे भारताच्या संदर्भात, वारसा स्थळांचे जतन आणि पर्यटन विकास यामध्ये संतुलन राखणे हेच शाश्वत पर्यटनाचे मूळ तत्त्व

मानले जाते.⁴ भारतामध्ये ताजमहल (1983), अजिंठा लेणी (1983), वेरूळ लेणी (1983), काझीरंगा राष्ट्रीय उद्यान (1985) आणि सुंदरबन राष्ट्रीय उद्यान (1987) अशी अनेक स्थळे युनेस्कोच्या जागतिक वारसा यादीत समाविष्ट आहेत.⁵ थोडक्यात सांस्कृतिक वारसाने समृद्ध अशा भारत देशात पर्यटनाला खूप संधी आहे. त्यासाठी भारताने सांस्कृतिक पर्यटनासाठी अधिक संरक्षित समुदाय केंद्रित दृष्टिकोन विकसित केले पाहिजेत. पर्यटनामध्ये गुंतवणूक केली पाहिजे. व्यवसायिक प्रशिक्षण दिले पाहिजे. यामुळे भारतातील पर्यटन व्यवसायाला चालना मिळून देशाचा विकास दर वाढेल. परंतु आज अनेक पर्यटन स्थळे खराब भौतिक पायाभूत सुविधांमुळे त्रासलेली आहेत. खराब रस्ते, स्वच्छतेतील त्रुटी, संदेशवहनाचा अभाव अशा अनेक कारणांची सोडवणूक केली तर भारतातील पर्यटन व्यवसायाच्या विकासासाठी वाव आहे.

सर्वसमावेशक पर्यटन -

भारतामध्ये सर्वसमावेशक पर्यटन ही संकल्पना पर्यटन स्थळांमधील स्थानिक समुदायाच्या सहभागावर आधारित आहे. पर्यटन विकासात स्थानिक समुदायांचा जास्तीत जास्त सहभाग वाढवून त्यांना रोजगाराच्या संधी उपलब्ध करून देणे. तसेच ग्रामीण भागाचा विकास साधणे असा हेतू सर्वसमावेशक पर्यटन दृष्टिकोनात आहे. प्राचीन कालखंडातील तैत्तिरीय उपनिषदामध्ये “अतिथी देवो भवः” ही संकल्पना पर्यटक म्हणून आलेल्या पाहुण्यांविषयी आदर आणि सर्वसमावेशकता दर्शवते. भारतीय संस्कृतीमध्ये परकीय प्रवाशांना सन्मानाने वागवले गेलेचे अनेक उल्लेख कागदपत्रातून मिळतात. सम्राट अशोकाच्या शिलालेखांमधून सर्व प्रजेसाठी समान सुविधा उपलब्ध करून दिल्याचे उल्लेख मिळतात. या अनुषंगाने सम्राट अशोकाने धर्मासाठी लवचिकता, वृक्षांची लागवड, धर्मशाळांची उभारणी अशा प्रकारच्या सार्वजनिक सुधारणांच्या माध्यमातून विकास केला जो पर्यटनास उपयुक्त होता.⁷

आधुनिक काळात भारत सरकारने राबवलेल्या राष्ट्रीय पर्यटन धोरणांमधून पर्यटनामध्ये सामुदायिक सहभाग तसेच ग्रामीण पर्यटनावर भर दिला आहे. सन २००२ च्या राष्ट्रीय पर्यटन धोरणामध्ये स्थानिक समुदायाचा पर्यटन नियोजनातील सहभाग, ग्रामीण भागातील सांस्कृतिक व नैसर्गिक संसाधनांचा शाश्वत वापर, स्वयंरोजगार व लघुउद्योगांना प्रोत्साहन, महिला आणि युवकांना पर्यटन प्रशिक्षण याची अंमलबजावणी करण्यासाठी धोरण आखण्यात आले. यानुसार पर्यटनाचा फायदा थेट स्थानिकांना मिळावा हा प्रमुख उद्देश होता.⁸ 2019 च्या राष्ट्रीय पर्यटन मसुद्यामध्ये समुदाय आधारित पर्यटनावर भर देत दिव्यांग लोकांसाठी पर्यटन व्यवसाय ही संकल्पना मांडली गेली.⁹ यावरून पर्यटन व्यवसायातील सर्वसमावेशक दृष्टिकोन स्पष्ट होतो.

डिजिटल पर्यटन -

आधुनिक पर्यटन विकासाचा मार्ग म्हणून भारतामध्ये डिजिटल इंडिया, ई-गव्हर्नन्स यासारखे उपक्रम घेण्यात येतात. भारतीय पर्यटन मंत्रालयाच्या सन 2022- 23 च्या वार्षिक अहवालानुसार, ई-व्हिसा प्रणाली, ऑनलाइन तिकीट बुकिंग, डिजिटल पेमेंट यामुळे पर्यटन सेवा अधिक सुलभ झाल्या आहेत.¹⁰ परिणाम स्वरूप परदेशी पर्यटकांना ई-व्हिसा सुविधा उपलब्ध झाल्याने त्यांच्या संख्येत वाढ झाली आहे. डिजिटल पेमेंट मोडमुळे व्यवहारात पारदर्शकता निर्माण होऊन पर्यटकांना आनंददायी पर्यटन करण्याची संधी प्राप्त झाली आहे. भारत देशाने पर्यटनामध्ये डिजिटल तंत्रज्ञानाचा प्रभावी वापर सुरू केल्याने पर्यटकांचे लक्ष 'स्मार्ट टुरिझम' कडे वळले आहे. यामध्ये विविध मोबाईल ॲप्स च्या आधारे पर्यटकांना पर्यटन स्थळाच्या ठिकाणाचे हवामान, नकाशे, स्थानिक महत्त्वाची आकर्षणे, हॉटेल, तिकीट बुकिंग इत्यादी सेवा एकाच प्लॅटफॉर्मवर उपलब्ध झाल्याने पर्यटन स्थळ निश्चित करणे आणि त्या ठिकाणी पर्यटन करणे सोपे होऊ लागले आहे. तसेच जागतिक स्तरावर भारतातील वारसा स्थळांचे चित्रण करून त्याआधारे व्हर्चुअल टूर उपलब्ध करून देण्यात आल्या आहेत. त्याचा फायदा देशातील पर्यटकांसह जगभरातील पर्यटकांना आकर्षित करण्यासाठी होत आहे. डिजिटल प्लॅटफॉर्मवर पर्यटन स्थळाच्या ठिकाणाच्या सर्व माहिती उपलब्ध झाल्यामुळे देशातील अनेक पर्यटक पर्यटन स्थळांना भेटी देतात. यामुळे स्थानिक कारागीर, मार्गदर्शक, व्यावसायिक, छोटे मोठे विक्रेते आणि लघुउद्योजकांना जागतिक बाजारपेठ उपलब्ध झाली असून यातून स्थानिक अर्थव्यवस्थेला चालना मिळालेली दिसून येते. महाराष्ट्र सरकारने सन 2016 साली 'महाराष्ट्र राज्य पर्यटन धोरण' आणून त्यामध्ये 'स्मार्ट पर्यटन' ही संकल्पना राबविण्यावर भर दिला. ऑनलाइन माहिती केंद्रे, डिजिटल नकाशे, सोशल

मीडियाचा वापर या माध्यमातून पर्यटन स्थळांची माहिती देश आणि जागतिक स्तरावर पोहोचविली गेल्याने अल्पावधीतच भारतातील अनेक पर्यटन स्थळांना परदेशी व भारतीय पर्यटकांनी भेटी दिल्या.¹¹ कोविड 2019 नंतर भारतामध्ये डिजिटल तंत्रज्ञानाचे महत्त्व वाढीस लागले. पर्यटकांना अनेक डिजिटल प्लॅटफॉर्म उपलब्ध करून देण्यात आले. या डिजिटल तंत्रज्ञानामुळे वारसा संवर्धन गर्दीवरील नियंत्रण आणि पर्यटकांना मिळालेले अनुभव समजण्यास मदत झाली. डिजिटल पर्यटनाच्या दृष्टिकोनातून पर्यटकांना मिळालेल्या सोयी सुविधा आणि माहिती ही सर्वसमावेशक आणि शाश्वत असून जागतिक नकाशावर भारताचे पर्यटन क्षेत्रातील नाव पुढे नेण्यासाठी उपयुक्त आहे. थोडक्यात भारताचा डिजिटल पर्यटन दृष्टिकोन हा केवळ तांत्रिक स्वरूपाचा बदल नसून तो पर्यटन क्षेत्रातील शाश्वत आणि सर्वसमावेशक असा संरचनात्मक झालेला बदल आहे.

सांस्कृतिक व वारसा पर्यटन -

भारतातील सांस्कृतिक व वारसा पर्यटन हे केवळ देशाचा आर्थिक स्रोत नसून ती एक राष्ट्रीय ओळख आहे. हजारो वर्षांची ऐतिहासिक परंपरा लाभलेल्या आपल्या देशात विविध भाषा, धर्म, कला, स्थापत्यकला आणि लोकजीवन याचा खूप मोठा सांस्कृतिक वारसा आहे. प्राचीन भारतातील सांस्कृतिक जतन संवर्धनाची साक्ष सम्राट अशोकाच्या शिलालेखांमधून पाहायला मिळते तर मध्ययुगीन काळातील ताजमहाल, कुतुबमिनार, विविध किल्ले, यासारख्या भारतीय स्थापत्य कलेतून समृद्ध परंपरा अनुभवता येते. ऐतिहासिक वारसा, विविध परंपरा, वास्तु शिल्पे, धार्मिक स्थळे यांचे जतन संवर्धनाच्या माध्यमातून भारतीय संस्कृतीचे दर्शन घडते. भारतीय पुरातत्त्व खात्याने अशा स्थापत्य आणि स्मारकांचा संवर्धनासाठी केलेल्या उपाययोजनांचाही उल्लेख पाहायला मिळतो.¹² युनेस्कोच्या जागतिक वारसा करार 1972 नुसार, सांस्कृतिक आणि नैसर्गिक वारसा स्थळांचे संरक्षण करण्यासाठी वैश्विक मूल्यांचे जतन करणे आवश्यक आहे असे सूचित केले आहे.¹³ त्यानुसार भारतातील ताजमहाल, काझीरंगा राष्ट्रीय उद्यान, सुंदरबन राष्ट्रीय उद्यान, अजिंठा- वेरूळ लेणी यासारख्या वारसा स्थळांचे जतन - संवर्धन आंतरराष्ट्रीय मानकानुसार करण्यात येईल असे घोषित केले. आर्थिक दृष्टिकोनातून पाहिले तर भारतातील सेवा क्षेत्रात पर्यटन क्षेत्र हे महत्त्वपूर्ण मानले जाते. वर्ल्ड ट्रेव्हल्स अँड टुरिझम कौन्सिल 2023 च्या अहवालानुसार, भारताच्या सकल देशांतर्गत उत्पादनात पर्यटन क्षेत्राचे लक्षणीय योगदान राहिले आहे. यातून लाखो लोकांना प्रत्यक्ष आणि अप्रत्यक्ष रोजगार निर्माण झाला आहे. अशा पर्यटनामुळे पारंपारिक उद्योग, स्थानिक लोककला, हस्तकला अशा छोट्या-मोठ्या उद्योगधंद्यांना चालना मिळाली आहे.¹⁴ पारंपारिक सण-उत्सव, लोककला, स्थानिक खाद्य संस्कृती, इत्यादी घटक पर्यटनाला जोडले गेल्यास पर्यटन व्यवसायामध्ये वृद्धी होईल. तसेच पर्यटन स्थळाच्या ठिकाणी राहत असलेल्या स्थानिक समुदायांच्या सहभागामुळे सांस्कृतिक सातत्य टिकवण्यास मदत होऊन सांस्कृतिक वारसा आणि शाश्वत पर्यटनाचा मार्ग खुला होण्यास मदत होईल.

ग्रामीण व कृषी पर्यटन -

भारत हा कृषिप्रधान देश असून देशातील बहुसंख्य जनता ही ग्रामीण भागात राहते. त्यांचा शेती हा मुख्य व्यवसाय असल्यामुळे ग्रामीण व कृषी पर्यटनास गती मिळू शकते. पारंपरिक शेती, ग्रामीण जीवनशैली, लोकसंस्कृती हस्तकला, आहार - विहार याचा अनुभव पर्यटकांना मिळाला तर पर्यटन व्यवसाय वाढीस लागून ग्रामीण जनतेला नवीन उत्पन्नाची साधने उपलब्ध होतील. ग्रामीण व कृषी पर्यटनामुळे स्थानिक शेतकऱ्यांना शेतीबरोबरच शेतीपूरक उद्योगांमधून उत्पन्न मिळू शकेल. तसेच महिलांना स्वयंरोजगार मिळण्याची संधी निर्माण होऊन ग्रामीण संस्कृतीचे जतन होईल. भारत सरकारने राष्ट्रीय पर्यटन धोरण 2002 अंतर्गत ग्रामीण पर्यटनाला रोजगार निर्मितीचे साधन म्हणून मान्यता दिली आहे.¹⁵ तसेच ग्रामीण हस्तकला, लोक परंपरा, ग्राम संस्कृतीला चालनाही दिल्याचे दिसून येते. महाराष्ट्र सरकारने महाराष्ट्र पर्यटन धोरण 2016 अंतर्गत कृषी पर्यटन केंद्रांना प्रोत्साहन दिले आहे.¹⁶ त्यामुळे महाराष्ट्रात अनेक ठिकाणी अशी कृषी पर्यटन केंद्रे उभी राहिली आहेत. अशा पर्यटन केंद्रांमध्ये राज्यासह इतर राज्यातून पर्यटक येत असतात. ग्रामीण व कृषी पर्यटनात स्थानिक लोकांचा सक्रिय सहभाग, पारंपारिक शेतीचे प्रदर्शन, लोकसंस्कृतीचे जतन, स्थानिक उत्पादनांना बाजारपेठ निर्माण करणे, महिला बचत गटांना प्रोत्साहन, युवकांना रोजगाराच्या संधी निर्माण करणे या माध्यमातून ग्रामीण अर्थव्यवस्था चालना मिळू शकते. त्यामुळे ग्रामीण

व कृषी पर्यटन हा केवळ पर्यटनाचा प्रकार नसून तो ग्रामीण भागातील सामाजिक आणि आर्थिक परिवर्तनाचे प्रमुख स्रोत बनू शकेल.

निष्कर्ष -

विकसित भारतासाठी पर्यटनाच्या दृष्टिकोनांचा अभ्यास केल्यानंतर असे दिसून येते की, भारतातील पर्यटन क्षेत्र सामाजिक, सांस्कृतिक, आर्थिक, पर्यावरणीय आणि तांत्रिक बदलाचे प्रमुख साधन ठरू शकते. विकसित भारताच्या ध्येयपूर्तीसाठी पर्यटनाचे विविध दृष्टिकोन हे परस्पर पूरक आहेत हेही सदर शोधनिबंधातून दिसून आले. प्राचीन, मध्ययुगीन कालखंडापासून होत असलेले पर्यटन हे वेगवेगळ्या कारणांमुळे होत असले तरी या पर्यटनाचा समकालीन व्यवस्थेवर परिणाम झाला होता. जसे की पर्यटनाच्या दृष्टिकोनातून सम्राट अशोकाचे शिलालेखांमधून पर्यटना विषयी माहिती मिळते. मध्ययुगीन कालखंडात सराया, घाट, रस्ते व धर्मशाळा अशा व्यवस्थांमुळे प्रवास आणि पर्यटन सुलभ झाले होते. थोडक्यात ऐतिहासिक कालखंडापासून पर्यटनाचा समकालीन व्यवस्थेवर परिणाम होत असल्याचे दिसते. आधुनिक काळात युनेस्कोने जागतिक वारसा स्थळाचे यादीत भारतातील अनेक स्थळांचा समावेश केला आहे यावरूनच विकसित भारतासाठी पर्यटन क्षेत्र वाढत असल्याचे पुरावे मिळतात. डिजिटल सुविधांमुळे पर्यटन व्यवसायाला गती निर्माण झाली आहे. या डिजिटल सुविधांमध्ये ई-व्हिसा, ऑनलाइन बुकिंग, डिजिटल पेमेंट आणि अधिकृत पर्यटन पोर्टल यांच्या समावेशामुळे पर्यटन व्यवसायात वाढ झाली आहे. परंतु दुसरीकडे वाढलेल्या पर्यटनामुळे एकाच पर्यटन किंवा वारसा स्थळाला मोठ्या बहुसंख्येने पर्यटक भेटी देत असल्याने पर्यटन स्थळाचे नुकसान होत असल्याचे दिसत आहे तर पायाभूत सुविधांची कमतरता ही दिसून येते. या पार्श्वभूमीवर भारत सरकारची योग्य धोरणे व त्याची अंमलबजावणी, पर्यावरणीय समतोल राखण्यासाठी उपाययोजना आणि स्थानिक लोकांचा सकारात्मक प्रतिसाद मिळवण्यासाठी प्रयत्न केले तर विकसित भारत घडविण्यामध्ये पर्यटनाची भूमिका महत्वाची ठरेल.

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विकसित भारतासाठी कृषी क्षेत्राचे महत्त्व

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सारांश

भारत हा ऐतिहासिक दृष्ट्या कृषीप्रधान देश आहे. आजही मोठ्या प्रमाणावर भारतातील लोकसंख्या प्रत्यक्ष व अप्रत्यक्ष ही शेतीवर अवलंबून आहे. प्रत्यक्ष उत्पन्न वाढीमध्ये कृषी क्षेत्राचा वाटा कमी असला तरी मोठ्या प्रमाणावर रोजगार निर्मिती ही कृषी क्षेत्रातून होते. कृषी क्षेत्र सक्षम असल्यास देशाला अन्नसुरक्षा प्राप्त होते व देश अन्नधान्याच्या बाबतीत स्वयंपूर्ण बनतो. कृषी क्षेत्रातील उत्पादन वाढीमुळे निर्यातीला चालना मिळते. निर्यात वाढीमुळे परकीय चलनात भर पडून राष्ट्रीय उत्पन्नात वाढ होते. थेट शेती उत्पादनांच्या निर्यातीबरोबरच कृषीआधारित उद्योगांमधून पक्क्या मालाचीही निर्यात करता येते व यातून मोठ्या प्रमाणावर रोजगार निर्मिती देखील होते. विकसित भारताच्या प्रक्रियेतील एक महत्त्वाचे उद्दिष्ट म्हणजे कृषी क्षेत्राचा शाश्वत विकास. कृषी क्षेत्रासंबंधीचा धोरणात्मक आराखडा तयार करून त्याची योजनाबद्ध पद्धतीने अंमलबजावणी केल्यास कृषी क्षेत्राच्या शाश्वत विकासाच्या दृष्टिकोनातून पाऊल टाकता येते व यामधून भारताच्या ग्रामीण भागाच्या विकासाचे ध्येयही साध्य करता येते. म्हणून एक सक्षम कृषी क्षेत्र असणे हे देश विकसित होण्याच्या दृष्टिकोनातून अत्यंत महत्त्वाचे आहे. यातून अर्थव्यवस्थेला स्थैर्य प्राप्त होण्यास मदत होते.

प्रस्तावना:

भारतासारख्या खंडप्राय देशात शेतीवर अवलंबून असलेली लोकसंख्या ही जवळपास निम्म्याहून अधिक आहे, तर देशाच्या अर्थव्यवस्थेत शेतीचा वाटा साधारणपणे 14 ते 16 टक्के आहे. अशावेळी विकसित देशाचा टप्पा गाठताना कृषी क्षेत्राला डावलता येत नाही. भारत सरकारने 2047 पर्यंत विकसित भारताचे उद्दिष्ट ठेवले आहे. आपल्या देशाच्या अर्थव्यवस्थेचा सध्याचा वाढीचा दर पाहता आपण विकसित देशांच्या बरेच मागे आहोत. शिवाय विकसित भारतासाठी किफायतशीर ठरत नसलेल्या शेतीवर कमीत कमी खर्च करून तो पैसा उद्योग-सेवासह इतर क्षेत्रांवर खर्च केला पाहिजे, असेही काही अर्थतज्ज्ञांना वाटते. देश विकसित, विकसनशील की अविकसित हे ठरविण्यासाठीचे काही मापदंड आहेत. त्यात प्रामुख्याने दरडोई उत्पन्न औद्योगिकीकरणाचा स्तर, सर्वसाधारण राहणीमानाचा दर्जा अशा आर्थिक निकषांबरोबर संबंधित देशाचा मानवी विकास निर्देशांक, साक्षरता, आरोग्य, जीवनमान यांचाही विचार केला जातो. आणि या सर्वच पातळ्यांवर आपली कामगिरी तितकी समाधानकारक नाही. असे असले तरी या देशातील कृषी आणि ग्रामीण भागाचा सुनियोजित विकासाचे प्रारूप तयार करून विकसित देशाची वाट आपण प्रशस्त करू शकतो. अर्थसंकल्पातही शेतीसाठीची तरतूद इतर क्षेत्राच्या मानाने कमीच दिसून येते. शेती आणि ग्रामीण विकासासाठी एकूण अर्थसंकल्पाच्या आठ टक्के निधी मिळतो, तर शहर विकास व इतर क्षेत्रांतील उर्वरित 40 ते 50 टक्के लोकसंख्येला 92 टक्के निधी मिळतो. अर्थसंकल्पीय तरतुदीतील हा विरोधाभास दूर करून कृषी व ग्रामीण विकासासाठी भरीव निधीची तरतूद केली पाहिजे. कृषी संशोधन आणि विकासाद्वारे हवामान स्मार्ट शेतीवर लक्ष केंद्रित करून प्रतिकूल हवामानात देखील उत्पादन वाढीमध्ये सातत्य ठेवता येईल.

कृषी आणि ग्रामीण क्षेत्रापुढील समस्या पाहता कृषी संशोधन तसेच विकासात्मक कामांवर भर द्यावा लागेल. कृषी संशोधन आणि विकासाद्वारे 'हवामान स्मार्ट शेती'वर लक्ष केंद्रित करावे लागेल. याद्वारे प्रतिकूल हवामान परिस्थितीत उत्पादनवाढीत सातत्य टिकविता येईल. त्याचबरोबर ग्रामीण भागात गुंतवणूक वाढवून शेतीसाठीच्या पायाभूत सुविधांबरोबर काढणी पश्चात अत्याधुनिक सेवासुविधा तसेच शेतीमाल विक्रीसाठी बाजारपेठांचे चांगले पर्याय शेतकऱ्यांना उपलब्ध करून द्यावे लागतील. अनुदान योजनांवर केलेल्या खर्चापेक्षा कृषी संशोधन आणि विकासावर केलेला खर्च अधिक चांगला परतावा देतो, हे अनेकदा अभ्यासाअंती सिद्ध झाले आहे. त्यामुळे कृषी संशोधन आणि विकास कामांत गुंतवणूक वाढविली तर

शेतकऱ्यांचे उत्पन्न वाढेल. या देशात बहुसंख्येने असलेल्या शेतकऱ्यांची क्रयशक्ती वाढली की बाजारातील सर्वच सेवा-उत्पादनांना मागणी वाढून एकंदरीतच देशाच्या अर्थव्यवस्थेला गती लाभेल, विकसित भारताचे स्वप्नही पूर्ण होईल.

उद्देश:

1. भारताच्या अर्थव्यवस्थेत कृषिक्षेत्राचे महत्त्व स्पष्ट करणे.
2. विकसित भारताच्या संकल्पनेत कृषिक्षेत्राचे योगदान विश्लेषित करणे.
3. कृषिक्षेत्रातील आधुनिकीकरण आणि तंत्रज्ञानाचा प्रभाव तपासणे.
4. रोजगार निर्मिती व दारिद्र्य निर्मूलनात कृषी क्षेत्राचे महत्त्व अधोरेखित करणे.
5. परकीय चलनामध्ये कृषी क्षेत्राचे योगदान अधोरेखित करणे
6. कृषीधोरणे आणि शासकीय योजनांचा परिणाम विश्लेषित करणे.

विषय विवेचन

1. आर्थिक विकासात शेतीची भूमिका व स्थान-

शेती ही आपल्या आर्थिक व्यवस्थेचा कणा आहे. भारतीय अर्थव्यवस्थेत शेती हा उपजीविकेचा प्रमुख स्रोत राहिला आहे. अलीकडच्या कालखंडामध्ये शेतीबरोबर औद्योगिक व सेवा क्षेत्राचा विकास होत असला तरी भारतीय अर्थव्यवस्था ही कृषी प्रधान अर्थव्यवस्था मानली जाते. औद्योगिक व सेवक क्षेत्राचा कितीही विकास झाला तरी कृषी क्षेत्राच्या विकासाकडे दुर्लक्ष करता येत नाही. कारण कृषी व्यवसाय अजूनही देशातील सर्वात मोठा व्यवसाय म्हणून ओळखला जातो. परंतु विविध आकडेवारीवरून असे दिसून येते, की देशाच्या राष्ट्रीय उत्पादनात शेती क्षेत्राचा वाटा सातत्याने कमी होत चालला आहे. स्वातंत्र्य प्राप्तीच्या वेळी राष्ट्रीय उत्पन्नातील कृषी व संलग्न क्षेत्राचा जीडीपी मधील हिस्सा 50% हून अधिक होता. त्यानंतर तो घसरत गेला. जीडीपी मधील कृषी व संलग्न क्षेत्राचा हिस्सा घसरत जाणे हे अर्थव्यवस्थेतील सकारात्मक व संरचनात्मक बदलाचा संकेत असतो. परंतु असे असले तरी विकसित देशाची तुलना करता पाश्चिमात्य विकसित देश व विकसित भारत यामध्ये मूलभूत फरक दिसून येतो तो म्हणजे भारतामध्ये असणारी मोठ्या प्रमाणावरील लोकसंख्या त्यातही ग्रामीण भागातील लोकसंख्येचे प्रमाण अधिक असणे. देश विकसित होण्याच्या प्रक्रियेमध्ये कृषी क्षेत्र जर मागे पडत चालले तर ग्रामीण भागाचा विकास रखडतो. सोई सुविधा या शहरापुरत्या मर्यादित राहतात व देशाचा मोठ्या प्रमाणावरील ग्रामीण भाग दुर्लक्षित राहतो. भारतासारख्या अर्थव्यवस्थेमध्ये हे प्रकर्षाने जाणवते. कृषी विकासाचे ध्येय साध्य करताना ग्रामीण विकासाचे देखील ध्येय साध्य होत असल्याने भारतासारख्या देशांमध्ये शाश्वत कृषी विकासाकडे लक्ष देऊन देशाच्या आर्थिक विकासात कृषी क्षेत्राचे स्थान बळकट करणे गरजेचे आहे.

2. निर्यातीच्या दृष्टीने कृषी क्षेत्राचे सक्षमीकरण

कृषी हे नेहमीच केंद्रीय अर्थसंकल्पामध्ये महत्त्वाचे केंद्र राहिले आहे. त्यामुळे कृषी क्षेत्रातील उत्पादन वाढीबरोबरच निर्यातीलाही वारंवार प्रोत्साहन देण्यात आले आहे. या धोरणामुळे आज कृषी क्षेत्रातील निर्यातीमध्ये वाढ होताना दिसत आहे. ज्यामध्ये प्रामुख्याने भात, मसाले, विविध फळे (आंबा, द्राक्षे, केळी) विविध प्रकारच्या भाज्या व अन्य कृषी उत्पादने यांचा समावेश आहे. आर्थिक वर्ष 2024 25 मध्ये सदरची निर्यात ही 51 अरब डॉलर एवढी होती, जी देशाच्या आर्थिक प्रगतीमध्ये आपला महत्त्वाचा वाटा दर्शवते. थेट कृषी उत्पादनांच्या निर्यातीबरोबरच कृषी उत्पादनांवर आधारित असलेल्या उद्योगांमधून तयार होणारी पक्की उत्पादने देखील मोठ्या प्रमाणावर निर्यात केली जातात. कृषी क्षेत्रातील निर्यात वाढीसाठी काही महत्त्वाच्या गोष्टींकडे लक्ष देणे गरजेचे आहे, जसे की पिकनिहाय मूल्यवर्धन, शीतगृहांची उभारणी, उत्तम दर्जाचे पॅकेजिंग, प्रक्रिया उद्योगांना चालना देणे, आंतरराष्ट्रीय मानांकनानुसार उत्पादनांची गुणवत्ता ठेवणे, निर्यातीसाठी प्रोत्साहनपर अनुदान देणे, डिजिटल मार्केटिंग चा वापर करून नवीन बाजारपेठांचा शोध घेणे. भारतीय कृषी उत्पादनाची मुख्य निर्यात ही अमेरिका, चीन, संयुक्त अरब अमिरात, बांगलादेश, व्हिएतनाम आणि युरोपियन देशांना केली जाते. त्याचबरोबर त्याचबरोबर कृषी-पणन विभागामार्फत ग्रामीण भागातील तरुणांना प्रक्रिया उद्योगांविषयी प्रशिक्षण देऊन केवळ कच्चा माल न विकता प्रक्रिया केलेला

मला विकण्यास प्रोत्साहित करणे. बंदरांवर निर्यातीसाठी सुलभ सुविधा उभारणे, अत्याधुनिक चाचणी प्रयोगशाळांची उभारणी करणे, सेंद्रिय आणि कीटकनाशक मुक्त उत्पादनांच्या निर्यातीवर भर देणे कारण याला जागतिक बाजारपेठेत मोठी मागणी आहे.

3. कृषी क्षेत्रातील विकासासाठी शासनाची धोरणे व उपक्रम

भारताचे कृषी क्षेत्र हे निसर्गाच्या लहरीपणावर आधारित असल्यामुळे या क्षेत्राला शाश्वत आधार देण्यासाठी केंद्र सरकार तसेच विविध राज्य सरकारांमार्फत कृषी क्षेत्राच्या विकासासाठी अनेक उपक्रम राबविले जातात. ज्यामध्ये थेट आर्थिक लाभ व सुरक्षा अंतर्गत प्रधानमंत्री किसान सन्मान निधी, प्रधानमंत्री पिक विमा योजना, प्रधानमंत्री किसान मानधन योजना इ. यामध्ये अल्पभूधारक शेतकऱ्यांच्या खात्यात दरसाल सहा हजार रुपये जमा करणे, नैसर्गिक आपत्तीमुळे होणाऱ्या नुकसानीसाठी विमा संरक्षण, लहान शेतकऱ्यांसाठी वृद्धापकाळ पेन्शन योजना इत्यादींचा समावेश होतो. त्याचबरोबर कृषी उत्पादनांच्या शाश्वत विकासासाठी प्रधानमंत्री कृषी सिंचन योजना, मृदा आरोग्य पत्रिका योजना, पारंपारिक कृषी विकास योजना, इ. यामुळे शेतकऱ्यांना प्रत्येक शेतीला पाणी या तत्त्वावर सिंचन सुविधा ठिबक व तुषार सिंचनामध्ये अनुदान दिले जाते, माती परीक्षण करून खतांचा संतुलित वापर करण्यावर भर दिला जातो. तसेच सेंद्रिय शेतीला चालना दिली जाते. महाराष्ट्रामध्ये पंजाबराव देशमुख जैविक शेती मिशन योजनेअंतर्गत जैविक शेतीचा प्रसार केला जातो. अशाप्रकारे केंद्र व राज्यस्तरावरून कृषी क्षेत्राला बळ दिले जाते. ज्यामध्ये आणखीन वाढ होणे अपेक्षित आहे. यामध्ये आणखीन एक महत्त्वाची बाब म्हणजे कृषी क्षेत्राला होणारा वित्त पुरवठा सुलभ करणे. नाबार्ड विविध वित्तीय संस्थांच्या माध्यमातून कृषी क्षेत्राला वित्त पुरवठा करत असले, तरी बँकांकडून कृषी क्षेत्राला होणाऱ्या वित्तपुरवठ्यामध्ये बऱ्याचशा त्रुटी आहेत. ज्यामध्ये अल्पभूधारक शेतकऱ्यांना कर्ज न मिळणे. गुंतागुंतीची व वेळखाऊ प्रक्रिया, तारणाची अट, कर्ज मिळविण्यात येणाऱ्या अडचणी, कर्जाचा उशिरा पुरवठा, सिविल स्कोरची सक्ती व प्रामुख्याने बँकांचा नकारात्मक दृष्टिकोन इत्यादी. या त्रुटी दूर करून कृषी क्षेत्राला होणारा वित्त पुरवठा सुलभ करण्याची आवश्यकता आहे.

4. कृषी उपक्रम राबवण्यात त्रुटी

शेतीमधील विविध पिकांच्या लागवडीचे तंत्र आणि पद्धती जुन्या आणि अकार्यक्षम असल्यामुळे उत्पादन खर्चात वाढ होते व उत्पादन कमी होते. अजूनही या पद्धतींमध्ये बदल होताना दिसत नाही. खते, सुधारित बियाणे, सिंचन, अवजारे इत्यादी प्रकारच्या मालमत्तेच्या स्वरूपात शेतीमध्ये होणारी गुंतवणूक अत्यंत कमी आहे. त्याचबरोबर कमकुवत आणि अपुऱ्या सिंचन सुविधा यामुळे शेतकऱ्यांना पावसावर अवलंबून राहावे लागते. कधी कधी दुष्काळ आणि पूर यामुळे संपूर्ण शेती व पिकांचे नुकसान होते. तथापि भारतातील शेतकरी कर्जाच्या खाईत लोटला जातो. त्यामुळे नंतरच्या काळात नव्या उमेदीने शेती क्षेत्राकडे लक्ष देणे त्याच्यासाठी अवघड होऊन जाते. तसेच भारतातील शेतकरी उच्च उत्पादन देणाऱ्या जातीच्या बियाणांचा अवलंब फार कमी करतात. याचा वापर कमी करण्याची कारणे म्हणजे बियाणांची उपलब्धता नसणे, पारंपारिक बियाणांचे प्राबल्य, शिफारस केलेल्या बियाणांचा पुरवठा कमी होणे आणि सदोष वितरण व्यवस्था यामुळे शेतकरी नाउमेद होऊन जातो. ग्रामीण भागातील अपुऱ्या वाहतूक व दळणवळण सोयी तसेच पावसाळ्यात अनेक भागांमधील रस्ते खराब झाले असल्याने शेतकऱ्यांना आपली उत्पादने योग्य बाजारपेठेपर्यंत पोहोचवण्यात अडचणी निर्माण होतात. शेतमाल खराब होऊ नये म्हणून शीतगृहांची सोय असते परंतु ही देखील पुरेशा प्रमाणात नाहीत किंवा असतील तर ती महाग आहेत जी शेतकऱ्यांना परवडत नाहीत. शेतकरी स्वयंसहायता गटांची स्थापना करून गट शेतीला प्राधान्य दिल्यास कृषी उत्पादनात मोठ्या प्रमाणात वाढ होऊ शकते. गट शेतीचा फायदा म्हणजे लागवडीपासून शेतमाल बाजारात जाईपर्यंत मार्गदर्शन व विपणन व्यवस्थापन यामध्ये फारशा अडचणी येत नाहीत. परंतु यामध्ये अनेक शेतकरी गट शेतीला तयार होत नसल्यामुळे अशा प्रकारचे उपक्रम राबविण्यात अडचणी येतात. त्यामुळे शेतकऱ्यांची मानसिकता बदलण्याचा प्रयत्न करणे गरजेचे आहे.

5. कृषी क्षेत्रात आधुनिक तंत्रज्ञानाचा वापर

कृत्रिम बुद्धिमत्तेच्या युगात प्रत्येक क्षेत्रात तंत्रज्ञानाचा वापर वाढत चालला आहे. या प्रक्रियेत कृषी क्षेत्रात देखील तंत्रज्ञानाचा वापर वाढणे गरजेचे आहे. पेरणी, लावणी, कापणी, सिंचन इत्यादी प्रक्रियांमध्ये ऑटोमेशनचा अवलंब केला

पाहिजे. ज्यामुळे शारीरिक कष्ट कमी होते व उत्पादन वाढते. भारतामध्ये विविध हवामानामध्ये विविध पिके घेतली जातात त्यामुळे अत्याधुनिक यंत्रणांच्या सहाय्याने शेतकऱ्यांना हवामानाविषयी अंदाज देणे, मोबाईल फोनचा वापर शेतीसाठी कसा करता येईल यासाठी कार्यशाळा राबवून शेतकऱ्यांना प्रशिक्षित करणे आवश्यक आहे. आज बऱ्याच ठिकाणी शेतीचे कामासाठी, जसे की फळे आणि भाज्या वेचणे, गवत कापणी त्याचबरोबर जनावरांचे दूध काढणे इत्यादीसाठी यंत्रांचा केला जातो आहे. यामुळे अंगमेहनत कमी होऊन कार्यक्षमता वाढते. आधुनिक तंत्रज्ञानाचे वापरामुळे शेतकरी पूर्वीपेक्षा जास्त पिके घेऊ शकतात. त्यामुळे शेतकऱ्यांना पिकाचे आणि पशुधनाची उत्पादन वाढवण्यास मदत होते. तसेच उत्पादनांची गुणवत्ता सुधारते. नवीन तंत्रज्ञानाचे वापरामुळे उत्पादन खर्चही कमी होऊन कृषी उत्पादनांच्या विपणन आणि वितरणाच्या नवीन पद्धती विकसित होतात. तंत्रज्ञानाच्या वापरामुळे श्रमाची देखील बचत होते. तथापि शेतीमध्ये तंत्रज्ञानाचे वापराचे काही तोटे देखील आहेत ज्यामध्ये महागडी यंत्रे व त्यांची देखभाल त्याचा काही प्रमाणात पर्यावरणाला होणारी हानी. असे असले तरी तंत्रज्ञानाचे वापरामुळे शेतीची उत्पादकता अनेक पटींनी वाढते.

6. परकीय चलनामध्ये कृषी क्षेत्राचे योगदान

अधिक परकीय चलनसाठी असलेल्या देशाची आंतरराष्ट्रीय पातळीवर चांगली प्रतिमा असते. कारण आंतरराष्ट्रीय व्यापारात या चलनसाठ्यावरून ठरणाऱ्या प्रतिमेचा चांगला उपयोग होतो. 1991 च्या आर्थिक संकटामध्ये भारत आंतरराष्ट्रीय स्तरावर डिफॉल्टर घोषित होण्याच्या उंबरठ्यावर होता. चांगला परकीय चलनसाठी असणारा देश परराष्ट्रीय व्यापारात चांगला भाग प्राप्त करतो. भारत मोठ्या प्रमाणावर कृषी उत्पादनांचे व कृषी उत्पादनांवर आधारित औद्योगिक उत्पादनांचे निर्यात करतो. यातून भारताला मोठ्या प्रमाणावर परकीय चलन प्राप्त होते. जे देशाच्या आर्थिक विकासात मोलाची भूमिका निभावते. सध्या परकीय चलन प्राप्तीमध्ये औद्योगिक व सेवा क्षेत्राचा वाटा मोठा असला तरी सुरुवातीच्या काळामध्ये देशाच्या औद्योगिक उभारणीसाठी अनेक वस्तूंच्या आयातीची गरज होती, ही कृषी क्षेत्राच्या निर्यातीतून मिळणाऱ्या परकीय चलनाच्या कमाईतून भागविली गेली. भारताचे कृषी क्षेत्र आज घडीला देखील परकीय चलन कमाईमध्ये आपली महत्त्वाची भूमिका बजावते आहे. धोरणात्मक योजनांची आखणी करून त्यांची योग्य अंमलबजावणी केल्यास निर्यातक्षम कृषी उत्पादनांची वाढ होऊन परकीय चलन प्राप्त करण्यात कृषीक्षेत्र मागे पडणार नाही.

7. दारिद्र्य निर्मूलन प्रक्रियेमध्ये कृषी क्षेत्राचे योगदान

जास्त प्रमाणात असलेली गरिबी त्या देशासाठी एक मोठी समस्या असते. दारिद्र्य रेषेखाली जास्त लोकसंख्या असलेल्या देशाचा जास्त वेळ आणि पैसा गरिबी दूर करण्यामध्ये जातो. त्यामुळे अर्थव्यवस्थेतील इतर क्षेत्रातील विकासाकडे सरकारचे दुर्लक्ष होते. आजही भारतातील बहुसंख्य गरीब लोक ग्रामीण भागात राहतात. स्वातंत्र्यानंतर इतक्या वर्षांनी देखील ग्रामीण भागातील दारिद्र्यरेषेखाली लोकसंख्या 35 ते 40 % एवढी आहे, त्यापैकी बहुतेक लोक लहान आणि सीमांत शेतकरी, भूमिहीन मजूर, अनुसूचित जाती आणि जमाती मधील आहेत. अनेक अभ्यासांती असे दिसून आले आहे की कृषी क्षेत्र हे आर्थिक वाढीसह गरिबी कमी करण्यास देखील मदत करते. कृषी विकासांमुळे लहान आणि सीमांत शेतकऱ्यांची उत्पादकता आणि उत्पन्न वाढते आणि शेती कामगारांचे रोजगार आणि वेतन वाढते त्यामुळे गरिबी आणि छुपी बेरोजगारी कमी होण्यास मदत होते. याशिवाय कृषी उत्पादकदेत वाढ झाल्यामुळे अन्नधान्याच्या किमती कमी होतात आणि महागाई नियंत्रणात राहते ज्यामुळे गरिबी कमी होण्यास हातभार लागतो. म्हणून गरीबी निर्मूलनाच्या धोरणातही कृषी विकास महत्त्वाची भूमिका बजावतो.

8. रोजगार निर्मितीमध्ये कृषी क्षेत्राचे योगदान

ग्रामीण समुदायांमध्ये शेती हा रोजगाराचा एक प्रमुख स्रोत म्हणून काम करतो. ज्यामुळे अनेक लोकांना उपजीविकेच्या संधी उपलब्ध होतात. देशाच्या उत्पन्न वाढीमध्ये कृषी क्षेत्राचा वाटा कमी असला तरी रोजगार निर्मितीमध्ये शेती क्षेत्र आजही महत्त्वाची भूमिका बजावते. विकसनशील देशांमध्ये, जिथे लोकसंख्येचा एक महत्त्वाचा भाग उदरनिर्वाहासाठी शेतीवर अवलंबून असतो तिथे शेती उत्पन्नाचा एक आवश्यक स्रोत म्हणूनही काम करते. पिक उत्पादन, पशुपालन आणि मत्स्यपालन यासारख्या विविध कृषी उपक्रमांमध्ये सहभागी होऊन ग्रामीण समुदाय उत्पन्न मिळवू शकतात

आणि त्यांचे राहणीमान सुधारू शकतात. शिवाय, शेती ही श्रम-केंद्रित पद्धतीने प्रोत्साहन देते ज्यामुळे कामगारांची मोठी मागणी निर्माण होते. ग्रामीण भागात प्रचलित असलेल्या लघुस्तरीय आणि कौटुंबिक शेतीसाठी अनेकदा मोठ्या प्रमाणात कामगार योगदानाची आवश्यकता असते. शेतीविषयक कामांमध्ये सहभागी होऊन ग्रामीण कुटुंबे अतिरिक्त उत्पन्न मिळवू शकतात आणि स्वतःला आर्थिक दृष्ट्या सक्षम बनवू शकतात. म्हणून कृषी क्षेत्र देखील रोजगार निर्मितीमध्ये मोलाचे योगदान देते.

निष्कर्ष:

भारत विकसित होत असताना कृषी क्षेत्राला कमी महत्त्व देता येणार नाही. शिवाय अनेक बाजूंनी काम करून कृषी क्षेत्राला सक्षम बनवले पाहिजे. कृषी क्षेत्रातून शाश्वत उत्पादनासाठी प्रयत्न केले पाहिजेत. आर्थिक विकास हा प्रामुख्याने शहरी भागाचा होत राहिला, तर ग्रामीण क्षेत्र म्हणजेच कृषी क्षेत्र हळूहळू मागे पडत जाईल. जे या देशासाठी कदापि परवडणारे नसेल. कृषी क्षेत्राचे उत्पादन वाढीमध्ये जरी योगदान कमी झाले असले तरी अन्नधान्याची सुरक्षा, गरिबी निर्मूलन, रोजगार निर्मिती यासारख्या गोष्टींमध्ये मोठे योगदान आहे. कृषी क्षेत्राशिवाय विकसित भारत म्हणजे फक्त शहरांमधील भारत असेल यामध्ये ग्रामीण भारत नसेल. म्हणून कृषी क्षेत्राचा शाश्वत विकास हा भारताच्या ग्रामीण विकासाचा पाया आहे. जो पाया विकसित भारतासाठी मजबूत असणे आवश्यक आहे.

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भारतीय स्वातंत्र्याची शताब्दी २०४७ साली होत आहे. ही शताब्दी साजरी करत असताना भारतात विकसनशील देश या अवस्थेतून विकसित देश या अवस्थेत परावर्तित करण्याचे संपूर्ण भारतीयांचे नियोजन आहे. म्हणून विकसित भारत २०४७ हा उपक्रम राबविण्यात येत आहे. अन्न ही सर्व प्राणीमात्रांची मूलभूत गरज आहे. मानवप्राणी हेच अन्न प्रक्रिया करून वापरतो. परिणामी ते चवदार व पचण्यास सुलभ बनते. ताजे-पौष्टिक अन्न आपणास निरोगी, उत्साही आणि मजबूत बनवते. खरंतर आपण जे खातो तेच आहोत त्यामुळे आपण काय खातो? ते का खातो? आणि कसे खातो? यासारखे प्रश्न मोठ्या चिंतेचे, चिंतनाचे आणि संशोधनाचे विषय आहेत. आपले अन्न, अन्न बनवण्याच्या आणि खाण्याच्या सवयी स्थानानुसार बदलतात. किंबहुना ते संबंधित स्थानीक संस्कृतीचे अंग असतात. त्यामुळे स्थानिक खाद्यसंस्कृतीच्या अभ्यासाच्या उद्देशाने संशोधन होणे आवश्यक आहे. राष्ट्रनिर्मितीमध्ये विकासात्मक परिवर्तनात सहभाग घेऊन सामाजिक स्वास्थ्य टिकवण्यासाठी, स्थानिक खाद्य संस्कृतीच्या इतिहासाच्या माध्यमातून देशहितासाठी कार्यप्रवृत्त होण्याच्या दृष्टीने इतिहासाचे पुनर्लेखन व पुनर्विचार करण्याचे महत्त्वाचे आहे. त्यासाठी प्रथम व दुय्यम स्वरूपाचे लिखित साधने, संकेतस्थळावरील माहिती आणि प्रत्यक्ष निरीक्षणासह मौखिक स्वरूपाच्या साधनांचा आधार घेण्यात आला आहे. ही या शोधनिबंधाची मर्यादा आहे.

विकसित भारत 2047 मध्ये भारताच्या स्वातंत्र्याच्या शताब्दी वर्षानिमित्त विकसित राष्ट्र बनण्याच्या आकांक्षा पूर्ण करण्यासाठीचा एक उपक्रम आहे. त्यामुळे हा उपक्रम व्यापक आणि शाश्वत विकास साध्य करण्यासाठी आर्थिक, सामाजिक, पर्यावरणीय आणि प्रशासकीय क्षेत्रातील प्रयत्नांना एकत्रित करण्याचा प्रयत्न करतो. ही संकल्पना भारताला उच्च राहणीमान, समता पूर्ण वाढ आणि पर्यावरणीय स्थैर्य, शाश्वत विकास साध्य करणारी एक आघाडीची जागतिक शक्ती म्हणून कल्पना करते. तरुणांचा सहभाग आणि नेतृत्व दृढ करणे अपेक्षित आहे.

मानवी जीवनावर स्थित्यंतरावर विकासावर स्थानिक स्थिती गतीचा नेहमीच प्रभाव पडत आलेला आहे. तो प्रभाव अधोरेखित करण्याचे कार्य इतिहास करते. आणि आत्मनिर्भर भारत घडवण्यासाठी जी काही महत्त्वाची कर्तव्य आहेत, त्यामध्ये स्थानिक वस्तूचा वापर करणे, शिक्षण आणि कौशल्य वाढवणे, पर्यावरणाचे रक्षण करणे, डिजिटल भारतात सहभागी होणे, स्थानीय उद्योगांना पाठिंबा देणे अशा बाबी अंतर्भूत असल्यामुळे इतिहासामधील स्थानिक घटकांचा त्यातील महत्त्वपूर्ण खाद्य संस्कृतीचा अभ्यास करणे महत्त्वाचे आहे.

इतिहास गतकालीन घटनांना नैसर्गिक, भौगोलिक, पर्यावरणीय इत्यादी कारणांनी झालेल्या बदलाचा आढावा घेतो. कारण निसर्गामध्ये शाश्वत अशी एकच गोष्ट आहे ती म्हणजे 'बदल'. हा बदल मानवी जीवनामध्ये ज्या प्रकारे घडतो त्याच प्रकारे इतिहास लेखनामध्ये सुद्धा घडत असतो. सुरुवातीला केवळ राजा महाराजांच्या लढाया इथपर्यंत मर्यादित असणारा इतिहास विषय आपल्या कक्षा रुंदावत नवनवीन प्रवाह निर्माण करत आहे. त्यात गतकाळाच्या अंशलक्षी (मायक्रो) अभ्यास हा नवीन पंत उदयास आलेला आहे. स्थानिक इतिहास हा मायक्रो हिस्ट्रीचा एक अवतार असून अध्याप पर्यंत विविधतेने नटलेल्या विकसनशील भारतामध्ये स्थानिक इतिहासाचे लेखक अत्यंत अल्प प्रमाणात झालेले आहे. यामध्ये स्थानिक इतिहास हा प्रादेशिक इतिहासाचा उपविभाग आहे. "एखाद्या स्थानावरती किंवा ठिकाणावरती केंद्रित राहून त्या स्थानाचे इतिहास लेखन करणे म्हणजे स्थानिक इतिहास लेखन करणे होय." इतिहास हा शब्द दोन अर्थाने वापरला जातो. एक म्हणजे घडून गेलेला भूतकाळ आणि दुसरे म्हणजे भूतकाळ विषयीचे लेखन.

विसाव्या शतकाच्या उत्तरार्धात मुख्य प्रवाही असलेल्या अनेक विषयांकडे इतिहासकारांचे लक्ष वळलेले आढळते. त्यापैकी एक विषय म्हणजे खाद्य संस्कृतीचा इतिहास. सामाजिक-सांस्कृतिक इतिहासाची उपशाखा नव्हे, तर स्वतंत्र ज्ञानशाखा म्हणून खाद्य संस्कृतीच्या इतिहासाच्या अभ्यासाची सुरुवात सुमारे 1970 च्या दशकापासून झाली. पाककलेचा किंवा पाककृतीचा अभ्यास असे या अभ्यासाचे मर्यादित स्वरूप नाही. “प्लॅनेट टू प्लेट” म्हणजे अन्न टिकवण्यापासून त्यावर विविध प्रक्रिया करून वेगवेगळ्या माध्यमांतून संस्कारीत झालेल्या अन्नांचा आस्वाद घेण्यापर्यंतच्या सर्व टप्प्यांचा अभ्यास यामध्ये अभिप्रेत आहे. आहारात सूक्ष्म पातळीवर होणारे बदल निव्वळ पर्यावरणीय, भौगोलिक किंवा तत्वज्ञानाच्या विकासांमुळेच होत नसतात. राजकीय, धार्मिक व सामाजिक प्रेरणाही त्यामागे असतात. काल आणि आवकाश, समाज आणि संस्कृती या परिवेशात खाद्य संस्कृतीची भूमिका काय किंवा खाद्यसंस्कृतीच्या माध्यमातून समाज कसा व्यक्त होत असतो हे समजवण्याचा प्रयत्न हा इतिहास करतो. खाद्यसंस्कृतीतून समाजातील अंतर संबंध अंतर्गत व्यक्त होत असतात म्हणून ऐतिहासिक परिवेशात खाद्य संस्कृतीचा अभ्यास करणे आवश्यक ठरते. खाद्य संस्कृतीच्या माध्यमातून इतिहासाच्या अनुयायार्थ शोधगारी इतिहास लेखन अशी याची व्याख्या करता येते.

पाककलेची पुस्तके खाद्य संस्कृतीच्या इतिहासाची मुख्य साधने ठरू शकतात. या पुस्तकातून पाककृती, जिन्नस, भांडी इत्यादींची प्रत्यक्ष माहिती मिळतेच, पण पाककलेच्या पुस्तकातून स्त्री अनेक मार्गाने व्यक्त होत असते स्त्रीची गृहिणी आणि माता या भूमिका अधोरेखित करणारी जरी ही पुस्तके असली तरी त्यांच्या आधारे स्त्रीवादी इतिहास मांडता येतो. दैनंदिन आहार प्रांत-धर्म यासंबंधी आहारातील फरक, आहारासंबंधी लिंगभेद, जातीय इतिहास इत्यादीवर प्रकाश टाकण्यासाठी ही पुस्तके पूरक ठरतात. आत्तापर्यंत दुर्लक्षित असलेल्या या संदर्भ साधनाचा इतिहासाच्या मांडणीसाठी अभ्यास केला जात आहे. आहाराच्या संदर्भातील अनेक संकेत संकल्पना हे लोकसाहित्यातून व्यक्त होत असतात. या माध्यमातून आहारासंबंधीच्या समजुती घडवल्या जातात. म्हणून लोकसाहित्य एखाद्या संस्कृतीचा अन्वयार्थ लावण्याचे एक महत्त्वाचे साधन म्हणून जगभर अभ्यासले जात आहे. या अभ्यासाला ‘फुडवेज’ असे म्हणतात. भारतीय खाद्यसंस्कृतीचा विस्तृत कालखंड यातील सातत्य-विविधता पाहता या विषयाची व्याप्ती सहज लक्षात येते. पण भारतात खाद्य संस्कृतीचा इतिहास अजूनही गांभीर्याने घेतला जात नाही.

परंतु भविष्यातील अन्नपदार्थ म्हणजे स्थानिक अन्नपदार्थ आहेत. ‘खरं प्रेम जसं कुठल्याही काळात टिकून राहतं तसं’ जे पदार्थ आपण पूर्वापार खात आलोय आणि आजही चवीने खाऊ शकतो ते सुपरफुड. या सर्व पदार्थांना पुढील पाच निकष लागू होतील. असे आंतरराष्ट्रीय ख्यातीच्या आहारतज्ज्ञ व फिटनेस एक्सपर्ट ऋजुता दिवेकर म्हणतात.

१. आपण राहत असलेल्या परिसरात हे पदार्थ नैसर्गिक रित्या पिकतात .
२. चवीला उत्तम आणि मायक्रोन्यूट्रिएंट्स ने संपन्न असतात.
३. झाडाचा/पिकाचा प्रत्येक भाग विशिष्ट पद्धतीने वापरता येतो.
४. आहारात वैविध्य आणतात.
५. हे पदार्थ पर्यावरणाला धोका पोहोचत नाहीत.

त्यात स्थानिक लोकांना रोजगार मिळवून देण्यास सामर्थ्य असते. आपलीच जीवनशैली चांगली राहण्यासाठी आधारभूत ठरतात.

पूर्वी (फार पूर्वी नाही 60 एक वर्षांपूर्वी पर्यंत) जे पदार्थ औषधी, वजन न वाढण्यासाठी, निरामय आरोग्यासाठी नावाजले जात असत, त्यांची आज शून्य किंमत झाली आहे किंवा ते लुप्त होऊन गेले आहेत. मग पाश्चात्य देश अशा अन्नपदार्थांना निरामय आरोग्यासाठी आणि वजन कमी करण्यासाठी नाविन्यपूर्ण पदार्थ म्हणून नावाजता आणि त्या अन्नपदार्थांचे पुनर्जीवन होते.

मग ‘करक्यूमीन’ आरोग्यदायी पदार्थांच्या दुकानात श्रमपरिहारासाठी व स्थूलता कमी करण्यासाठी प्रवेश करते आणि ही आपली साधीसुधी हळद आहे हे आपल्या गावीही नसते. ओमेगा- श्री आणि ताकद मिळवण्यासाठी आपण ‘मोरिंगा पावडर’ पाण्यात घालून पितो ते दुसरे तिसरे काही नसून शेवयाच्या शेंगा असतात. ‘अॅमॅरॅन्थ’ म्हणजे काय? तर आपली

स्टेशनरीवरसुद्धा मिळते ती राजगिरा चिक्की. भारतातल्या प्रत्येकाला खिचडीतले डाळ तांदळाचे प्रमाण ठाऊक असते मात्र पाश्चिमात्य देशात त्यांचे प्रमाण शोधून डॉक्टरेट मिळवली जाते. कदाचित याच विषयाला धरून पुढे पोस्ट डॉक्टरेट मिळवण्यासाठी आजारी पडले अथवा ऋतू बदलला की खिचडीतली डाळ तांदळाचे प्रमाण कसे बदलावे हा विषय घेतला जाईल. इडली डोसा करण्यासाठी लागणारे प्रमाण हा आणखी एक संशोधनाचा विषय! आपली ही पूर्वपार चालत आलेली खाद्य संस्कृती आपण गृहीत धरतो आणि तिचं मोल अजिबात जाणत नाही.

तसं म्हटले तर पाकशास्त्रीय ग्रंथाबाबत महाराष्ट्र अग्रेसर आहे. सोमेश्वर राजाच्या 'मानसोल्लास' यामध्येयुगीन संस्कृत ग्रंथात अनेक कृती दिलेल्या आहेत त्यात इडलीची ही कृती आहे. सयाजीराव गायकवाड यांनी भारतातल्या आणि परदेशातल्या अनेक खाद्यपदार्थांची विविध पुस्तके मराठी आणि गुजरातीत काढून त्यांची जगाला ओळख करून दिली. महाराष्ट्रावर त्यांचे हे अपरिमित उपकार आहेत. पण जाणतो कोण? त्याशिवाय मराठी माणसाच्या जेवनातल्या व फराळाच्या पदार्थाबद्दल एक अपूर्व ग्रंथ समर्थ रामदासांचे शिष्य व मित्र नवाथे यांनी 'भोजन कुतूहल' या नावाने संस्कृतातून लिहिला आहे. चकल्या, मोती लाडू, वेगवेगळ्या भाज्या यांचे वर्णन त्यांनी यात केले आहे. चारशे वर्षांपूर्वी हा आद्य पाकशास्त्रीय ग्रंथ म्हणजे महाराष्ट्रीयन खाद्य-अभिरुचीचा निदर्शक आहे. जे पदार्थ करायचे, ते वैद्यकीय दृष्ट्या कसे पाचक व पोषक होतील याचे शुश्रुताच्या आधारे या ग्रंथात विवेचन केले आहे.

आर्थिक-सामाजिक बदलाच्या परिणामस्वरूप तीस-पस्तीस वर्षांपूर्वी स्त्रिया मोठ्या प्रमाणात नोकरी करायला लागल्या आणि त्यानंतर स्वयंपाकघरामध्ये हळूहळू परंतु ठळक जाणवतील असे बदल होऊ लागले. त्याच सुमारास उंचावलेला आर्थिक स्तरामुळे घरात फ्रिज, मिक्सर आले. स्वयंपाकाचा गॅस घरोघरी पोहोचला. पदार्थ साठवून ठेवता येऊ लागली. पटकन वाटतं येऊ लागले. चटकन शिजवता येऊ लागले. त्यामुळे स्वयंपाकाच्या पद्धती बदलल्या, एवढेच नव्हे तर पदार्थही बदलले. तसंच स्त्रिया जास्त वेळ घराबाहेर असल्याने चटकन होतील असे पदार्थ करण्याकडे कल वाढला. ज्याला जास्त तयारी लागते व वेळ लागतो ते पदार्थ मागे पडले आणि बाजारात तयार मिळणारे पदार्थ घरी यायला सुरुवात झाली. वेगवेगळ्या प्रकारची बिस्किट, केक, यापासून सुरू झाली ती मॅगी नूडल्स च्या मार्गाने जाऊन 'रेडी टू इट' वा 'रेडी टू कुक' पदार्थापर्यंत पोहोचली. पण ते देताना त्यात पौष्टिक काही नाही हे ध्यानात येऊ लागलं मग स्वतःच्या लहानपणी खाल्लेले पदार्थ आठवू लागले. आणि स्थानिक खाद्यसंस्कृती च्या इतिहास लेखनाची सशक्त भारतासाठी महत्वपूर्ण खांब बनण्याची आवश्यकता निर्माण झाली. कारण नव्याने कार्यरत असलेला हा इतिहासलेखनाचा प्रवाह भारतीयांना सुदृढ आरोग्य मिळवून देण्याबरोबरच स्थानिक लोकांना रोजगार मिळवून देण्याबाबतही सक्षम आहे.

निष्कर्ष:

१. स्थानिक खाद्यसंस्कृतीच्या इतिहासलेखनामुळे बदलत्या जीवनशैलीने लोप पावलेले आरोग्यदायी खाद्यपदार्थ उजेडात येतील.
२. स्थानिक खाद्यसंस्कृती ही स्थानिक लोकांना रोजगार प्रदान करू शकते.
३. स्थानिक खाद्यसंस्कृतीच्या संशोधनामुळे आरोग्यदायी व सशक्त भारत निर्माण होण्यास मदत होते.

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विकसित भारत: डॉ. बाबासाहेब आंबेडकर यांचे योगदान आणि महत्त्व

विनायक केरबा कांबळे

सहायक प्राध्यापक, इतिहास विभाग

किसन वीर महाविद्यालय, वार्ड

प्रस्तावना

भारत सरकारने २०४७ पर्यंत "विकसित भारत" हे राष्ट्रीय ध्येय जाहीर करून स्वातंत्र्याच्या शताब्दी वर्षात भारताने सर्वांगीण प्रगती साधलेले, आत्मनिर्भर, न्यायाधिष्ठित आणि जागतिक पातळीवर प्रभावी राष्ट्र म्हणून उदयास यावे, अशी दूरदृष्टी मांडली आहे. या ध्येयामागील मूळ संकल्पना केवळ आर्थिक वृद्धी किंवा पायाभूत सुविधांच्या विस्तारापुरती मर्यादित नसून सामाजिक, राजकीय, शैक्षणिक, सांस्कृतिक आणि पर्यावरणीय आयामांचा समन्वय साधणारी व्यापक राष्ट्रकल्पना आहे. 'विकास' हा शब्द GDP वृद्धी, औद्योगिकीकरण किंवा तंत्रज्ञानातील झपाट्याने होणारी प्रगती यापुरता मर्यादित ठेवणे ही संकल्पनेची मर्यादित व्याख्या ठरेल. प्रत्यक्षात विकास हा मानवी प्रतिष्ठा, समता, सामाजिक न्याय, संसाधनांचे न्याय्य वितरण, लोकशाही मूल्यांची जपणूक आणि शाश्वततेशी निगडित असतो.

या संदर्भात डॉ. बाबासाहेब आंबेडकर यांचे विचार अत्यंत सुसंगत आणि मार्गदर्शक ठरतात. त्यांनी राष्ट्रनिर्मितीची संकल्पना सामाजिक न्याय, राजकीय समता, आर्थिक लोकशाही आणि वैचारिक स्वातंत्र्य यांच्या एकात्मिक चौकटीत मांडली. त्यांच्या दृष्टीने लोकशाही ही केवळ शासनपद्धती नसून जीवनपद्धती होती. संविधाननिर्मितीत त्यांनी केलेले नेतृत्व, वंचित घटकांच्या हक्कांसाठीचा सातत्यपूर्ण संघर्ष, स्त्री-पुरुष समानतेचा पुरस्कार, कामगार व शेतकरी वर्गांच्या हक्कांचे संरक्षण, तसेच वैज्ञानिक दृष्टिकोनाचा आग्रह- हे सर्व घटक विकसित भारताच्या वैचारिक अधिष्ठानाशी निगडित आहेत. प्रस्तुत अभ्यासात विकसित भारत २०४७ या संकल्पनेचा बहुआयामी विचार करताना आंबेडकरी तत्त्वज्ञानाचे पुनर्वाचन करून भविष्यातील राष्ट्रनिर्मितीसाठी आवश्यक दिशादर्शन करण्याचा करण्याचा प्रामाणिक प्रयत्न सदर शोधनिबंधात करण्यात आलेला आहे.

१. विकसित भारत २०४७ संकल्पना, परिमाणे आणि वैचारिक चौकट

"विकसित भारत" ही संकल्पना बहुपरिमितीय (multi-dimensional) आहे. तिच्या अभ्यासासाठी केवळ आर्थिक निर्देशकांवर अवलंबून राहणे अपुरे ठरते. विकासाचे मूल्यमापन करताना आर्थिक प्रगती, सामाजिक समता, राजकीय स्थैर्य, शैक्षणिक व वैज्ञानिक उन्नती, सांस्कृतिक समृद्धी आणि पर्यावरणीय शाश्वतता या घटकांचा परस्परसंबंध लक्षात घेणे आवश्यक आहे.

१.१ आर्थिक प्रगती व उत्पादनक्षमता

उच्च GDP, औद्योगिक वाढ, निर्यातक्षम उत्पादन, तंत्रज्ञानाधारित उद्योग, रोजगारनिर्मिती आणि उद्योजकतेला चालना; हे विकसित राष्ट्राचे पारंपरिक निर्देशक मानले जातात. तथापि, आंबेडकरी दृष्टिकोनानुसार आर्थिक विकास हा 'समावेशक' असला पाहिजे. उत्पन्नवाढीबरोबरच संपत्तीचे न्याय्य वितरण, उत्पादनसाधनांवरील प्रवेश आणि संधीचे समानीकरण यांना तितकेच महत्त्व आहे.

१.२ सामाजिक न्याय व समावेशकता

जात, धर्म, लिंग, वर्ग, प्रदेश या आधारांवर निर्माण झालेली विषमता दूर केल्याशिवाय विकास सर्वसमावेशक ठरत नाही. सामाजिक न्याय ही केवळ धोरणात्मक संकल्पना नसून मानवी हक्कांचा मूलाधार आहे. आंबेडकरांनी सामाजिक लोकशाहीशिवाय राजकीय लोकशाही टिकू शकत नाही, असे ठामपणे प्रतिपादन केलेले आहे.

१.३ राजकीय स्थैर्य व संवैधानिक मूल्ये

लोकशाही संस्थांची मजबुती, कायद्याचे राज्य, अभिव्यक्ती स्वातंत्र्य, पारदर्शकता आणि जबाबदारी ही विकसित राष्ट्राची राजकीय वैशिष्ट्ये आहेत. संवैधानिक चौकटीतूनच न्याय्य शासनव्यवस्था उभी राहते.

१.४ शैक्षणिक व वैज्ञानिक उन्नती

ज्ञानाधिष्ठित अर्थव्यवस्था ही आधुनिक विकासाची किल्ली आहे. संशोधन, नवोन्मेष, तंत्रज्ञान आणि मानवी भांडवलाची उभारणी ही दीर्घकालीन प्रगतीची हमी देतात असे त्यांनी निश्चून सांगितलेले आहे.

१.५ पर्यावरणीय संतुलन

शाश्वत विकासाशिवाय आर्थिक वृद्धी दीर्घकाळ टिकू शकत नाही. संसाधनांचे संवर्धन, पर्यावरणीय न्याय आणि भावी पिढ्यांच्या हक्कांचा विचार करणे आवश्यक आहे. वरील सर्व परिमाणे आंबेडकरांच्या विचारांमध्ये अंतर्भूत आढळतात. त्यांनी 'समता, स्वातंत्र्य आणि बंधुता' या त्रिसूत्रीला राष्ट्रनिर्मितीची आधारशिला मानलेले आहे.

२. संविधाननिर्मिती: विकसित भारताचे अधिष्ठान

भारतीय राज्यघटना ही राष्ट्रजीवनाची मूलभूत रचना आहे. तिच्या मसुदा समितीचे अध्यक्ष म्हणून डॉ. आंबेडकरांनी संविधानाला सामाजिक परिवर्तनाचे साधन बनविले.

२.१ मूलभूत अधिकार आणि समतेचा सिद्धांत

संविधानातील मूलभूत अधिकार नागरिकांना समानता, स्वातंत्र्य आणि न्यायाची हमी देतात. भेदभावविरोधी तरतुदी आणि कायद्यापुढील समानता ही सामाजिक न्यायाची किल्ली आहेत. विकसित राष्ट्रासाठी 'समान संधी' हा अत्यावश्यक घटक आहे.

२.२ आरक्षण आणि प्रतिनिधित्व

ऐतिहासिक अन्यायाचे परिमार्जन आणि सामाजिक सक्षमीकरणासाठी आरक्षण ही धोरणात्मक साधनरचना आहे. प्रतिनिधित्वाविना लोकशाही अपुरी ठरते, ही आंबेडकरी जाणीव आजही तितकीच महत्त्वाची आहे.

२.३ राज्याच्या धोरण निर्देशक तत्त्वे

सामाजिक व आर्थिक न्याय, शिक्षणाचा प्रसार, सार्वजनिक आरोग्य, समान वेतन, कल्याणकारी राज्याची संकल्पना हे सर्व विकसित राष्ट्राचे अविभाज्य घटक आहेत. संविधानातील निर्देशक तत्त्वे भविष्यातील राष्ट्रदिशा ठरवतात असे स्पष्टपणे दिसून येते.

३. सामाजिक परिवर्तन: जातिनिर्मूलन आणि बंधुता

आंबेडकरांच्या विचारांचा केंद्रबिंदू सामाजिक समता होता. त्यांनी जातिव्यवस्थेला सामाजिक विषमतेचे मूळ कारण मानले.

३.१ जातिनिर्मूलनाचा आग्रह

Annihilation of Caste या ग्रंथात त्यांनी जातिव्यवस्थेचे तात्त्विक आणि सामाजिक विश्लेषण करून तिच्या निर्मूलनाची मागणी केली. सामाजिक ऐक्याशिवाय राष्ट्राची प्रगती शक्य नाही, हे त्यांनी स्पष्ट केले.

३.२ स्त्री-समानतेचे धोरण

हिंदू कोड बिल द्वारे स्त्रियांना वारसाहक्क आणि संपत्तीवरील अधिकार देण्याचा त्यांनी प्रयत्न केला. स्त्रीशिक्षण आणि आर्थिक स्वावलंबन हे प्रगत समाजाचे निर्देशक असल्याचे त्यांनी प्रतिपादन केले.

३.३ बंधुता आणि सामाजिक एकात्मता

स्वातंत्र्य आणि समतेइतकीच बंधुता महत्त्वाची आहे. बंधुतेशिवाय लोकशाहीचे मूल्य टिकत नाही. विकसित भारतासाठी सामाजिक सलोखा आणि बहुसांस्कृतिकतेचा स्वीकार आवश्यक आहे.

४. आर्थिक दृष्टिकोन समावेशक व शाश्वत विकास

डॉ. आंबेडकर हे प्रगल्भ अर्थतज्ज्ञ होते. औद्योगिकीकरण, नियोजन आणि संसाधनांचे सार्वजनिक नियंत्रण यांचा त्यांनी पुरस्कार केला.

४.१ औद्योगिकीकरण आणि रोजगार

कृषीप्रधान अर्थव्यवस्थेचे औद्योगिक रूपांतर केल्यास उत्पादनवाढ व रोजगारनिर्मिती साध्य होईल, असे त्यांनी मांडले.

४.२ कामगार धोरणे

आठ तासांचा कामकाज दिवस, वेतनसंरक्षण, मातृत्व लाभ, सामाजिक सुरक्षा यासारख्या उपाययोजना त्यांच्या कार्यकाळात पुढे आल्या.

४.३ जलसंपत्ती व पर्यावरणीय दृष्टी

जलसंपत्तीचे राष्ट्रीयीकरण आणि वैज्ञानिक व्यवस्थापन यांचा त्यांनी आग्रह धरला. आजच्या पर्यावरणीय संकटाच्या पार्श्वभूमीवर त्यांचे विचार अधिक सुसंगत ठरतात.

५. शिक्षण, विज्ञान आणि वैचारिक स्वातंत्र्य

"शिका, संघटित व्हा आणि संघर्ष करा" हा त्यांचा संदेश सामाजिक उन्नतीचा पाया आहे. शिक्षणाद्वारेच सामाजिक गुलामगिरीचा अंत शक्य आहे. ज्ञानाधिष्ठित समाजनिर्मिती, संशोधन, नवोन्मेष आणि तर्कनिष्ठ विचारसरणीचा प्रसार हे विकसित भारतासाठी अत्यावश्यक आहे.

६. लोकशाही, संवैधानिक नैतिकता आणि संस्थात्मक संतुलन

आंबेडकरांनी 'संवैधानिक नैतिकता' (constitutional morality) या संकल्पनेचा आग्रह धरला. कायद्याबरोबर मूल्यांची जपणूक, संस्थांचे संतुलन, पारदर्शकता आणि जबाबदारी ही विकसित राष्ट्राची लक्षणे आहेत. बहुसांस्कृतिक समाजात धर्मनिरपेक्षता आणि राष्ट्रीय एकात्मता यांचा समन्वय राखणे आवश्यक आहे.

७. विकसित भारत २०४७ : आंबेडकरी दिशादर्शन

- २०४७ पर्यंत विकसित राष्ट्र घडविताना-
- वंचित घटकांचा धोरणनिर्मितीत सहभाग
- गुणवत्तापूर्ण शिक्षणाची सार्वत्रिक उपलब्धता
- जातीय व लैंगिक विषमतेचे निर्मूलन
- संसाधनांचे न्याय्य वितरण
- संवैधानिक मूल्यांचे काटेकोर पालन
- तंत्रज्ञान आणि नवोन्मेषाचा सामाजिक उपयोग
- पर्यावरणीय शाश्वततेचा पुरस्कार
- ही तत्त्वे आंबेडकरी विचारांशी आजही सुसंगत आहेत.

निष्कर्ष

"विकसित भारत २०४७" ही संकल्पना सर्वांगीण राष्ट्रनिर्मितीशी निगडित आहे. आर्थिक वृद्धीबरोबरच सामाजिक न्याय, समता, बंधुता आणि संवैधानिक नैतिकता या मूल्यांचा अंगीकार केल्याशिवाय विकास अपूर्ण राहील. डॉ. बाबासाहेब आंबेडकर यांचे तत्त्वज्ञान जागतिकीकरण आणि तांत्रिक परिवर्तनाच्या युगातही मार्गदर्शक दीपस्तंभ ठरते. त्यांच्या विचारांचा सखोल अभ्यास आणि व्यवहार्य अंमलबजावणी यांद्वारेच भारत खऱ्या अर्थाने समताधिष्ठित, न्याय्य आणि सर्वांगीण विकसित राष्ट्र म्हणून २०४७ मध्ये उदयास येऊ शकते.

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स्वतंत्र भारतातील शारीरिक शिक्षण व भारतीय सुवर्ण महोत्सव (२०४७)

पर्यंतचा शारीरिक शिक्षणाचा अभ्यास

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सारांश :

प्रस्तुत शोधनिबंधात स्वतंत्र भारतातील शारीरिक शिक्षणाच्या धोरणात्मक विकासाचा अभ्यास करण्यात आला असून 1948 मधील ताराचंद समिती पासून ते खेळो भारत नीती 2025 आणि विकसित भारत 2017 या संकल्पनेपर्यंतच्या क्रीडा धोरणांचा विस्तार आढावा घेण्यात याचा प्रयत्न करण्यात आलेला आहे. या शोधनिबंधामध्ये आंतरराष्ट्रीय क्रीडा संघटनांची भूमिका राष्ट्रीय क्रीडा धोरणे केंद्र सरकार विविध योजना शालेय उच्च शिक्षणातील शारीरिक शिक्षणाचे स्थान तसेच ग्रामीण व शहरी भाग व तसेच आदिवासी भागातील क्रीडाविकासातील तफावत यांचे विश्लेषण करण्यात याचा प्रयत्न करण्यात आलेला आहे आधुनिक काळात क्रीडा विज्ञान क्रीडा अभियांत्रिकीकरण कृत्रिम बुद्धिमत्ता ए आय डिजिटल तंत्रज्ञान आणि फिटनेस प्रोटोकॉल यांच्या वापरामुळे खेळाडूंच्या शारीरिक व मानसिक क्षमतेच्या विकासावर होणारा परिणाम ही या शोधनिबंधात अभ्यासण्यात आला आहे. संशोधनात असेही निश्चित होते की भारतीय क्रीडा धोरणे व योजना दूरदृष्टीकोनात्मक व प्रगत असल्या तरी त्याची प्रभावी अंमलबजावणी तळागाळापर्यंत होत नाही क्रीडा विज्ञानाचा मर्यादित वापर आर्थिक व सामाजिक अडचणी तसेच प्रशासनातील अपारदर्शकता या प्रमुख समस्या भेडसाविण्यात येत आहेत खेळाडू क्रीडा क्षेत्रातून बाहेर पडतात आर्थिक समस्यांमुळे आंतरराष्ट्रीय यशाला मर्यादा लागतात हे या ठिकाणी जाणून येते. विकसित भारत 2047 या ध्येयाची पूर्तता करण्यासाठी शारीरिक शिक्षण व क्रीडा क्षेत्रात धोरण आणि अंमलबजावणीची यामधील दरी कमी करणे वैज्ञानिक व तांत्रिक दृष्टिकोन स्वीकारणे तळागाळातील प्रतिभेला समान संधी उपलब्ध करून देणे आणि क्रीडेला राष्ट्रीय संस्कृतीचे स्वरूप देणे अत्यावश्यक असे आहे असे या अभ्यासातून स्पष्ट होत आहे.

सूचक शब्द (Key Words) : शारीरिक शिक्षण, क्रीडा विकास, राष्ट्रीय क्रीडा धोरण, स्वतंत्र भारत, क्रीडा विज्ञान, क्रीडा अभियांत्रिकी, फिट इंडिया चळवळ, खेळो इंडिया / खेळो भारत नीती, प्रतिभा शोध, पायाभूत सुविधा, प्रशिक्षित मनुष्यबळ, डिजिटलायझेशन, कृत्रिम बुद्धिमत्ता (AI), महिला व दिव्यांग क्रीडा, ग्रामीण व आदिवासी क्रीडा विकास, विकसित भारत २०४७.

प्रस्तावना

स्वतंत्र भारताच्या विकासांमध्ये शारीरिक शिक्षणाला अगण्यसाधारण महत्त्व प्राप्त आहे शारीरिक शिक्षण म्हणजे मानसिक सामाजिक नैतिक तसेच वर्तनातील बदल घडवणारा अभ्यास यामध्ये 1947 भारत स्वतंत्र झाला तेव्हापासून क्रीडा क्षेत्रामध्ये अमोल आगर बदल घडत गेले या बदलांमध्ये 2047 पर्यंत अमृत महोत्सवापर्यंत जे सक्षमीकरण तंदुरुस्ती व क्रीडापटू यांच्यामध्ये जी ध्येय ठरवण्यात आली गेली या ध्येयांवरती जो अभ्यास व धोरणे त्या धोरणांचा अभ्यास या शोधनिबंधाच्या आधारे आपण करणार आहोत यामध्ये आंतरराष्ट्रीय क्रीडा संघटना ते राष्ट्रीय क्रीडा संघटना तसेच केंद्र सरकारच्या विविध योजना व शारीरिक शिक्षणाच्या विविध शाखा या सर्व गोष्टींचा तसेच शहरी भागापासून ते ग्रामीण स्तरापर्यंत विविध योजनांची पूर्तता व त्याची अंमलबजावणी खेळाडूंचे मानसिक व शारीरिक स्वास्थ्य यामध्ये एआय सारख्या आधुनिक उपकरणांचा वापर करून फिटनेस व क्रीडा कौशल्यांचे प्रशिक्षण क्रीडा अभियांत्रिकीकरण क्रीडा विज्ञान व येणाऱ्या जागतिक स्पर्धांचे आखणी रूपरेषा यासाठी आवश्यक असणारे तांत्रिक प्रशिक्षणाच्या मूलभूत सोयी सुविधा व तांत्रिक प्रशिक्षण संपूर्ण ज्ञानाने परिपूर्ण असणारे प्रशिक्षक यांची व्यवस्था व इतर देशांशी भारतीय खेळाडूंची तुलनात्मक बरोबरी व त्यांच्या शारीरिक शिक्षण या सांदर्भातील घडामोडी या सर्व गोष्टींचा समावेश करून अभ्यासात्मक आढावा घेत आहे.

स्वतंत्र भारतातील शारीरिक शिक्षणाचा धोरणात्मक विकास :

भारतीय शारीरिक शिक्षणाच्या विकासासाठी महत्त्वपूर्ण ठरणारा विविध गोष्टी आहेत यामध्ये 1914 भारतात पहिले महाराष्ट्रातले पहिले हनुमान व्यायाम प्रसार मंडळ अमरावती 1920 फिजिकल एज्युकेशन कॉलेज सुरुवात ते १९४८ मध्ये **ताराचंद समिती** तयार झाली या समिती अंतर्गत पुढील माहिती. हे स्वतंत्र भारतातील शारीरिक शिक्षणाचे एक महत्त्वपूर्ण निर्णयात्मक विकासाचे धोरण होते यामध्ये डॉक्टर ताराचंद हे या अध्यक्ष स्थानावरती असून या समितीने शारीरिक शिक्षणात तसेच क्रीडा व मनोरंजनाचा दर्जा सुधारण्यासाठी विविध केंद्रीय संस्थांची स्थापना करणे शिक्षक प्रशिक्षण आणि अभ्यासक्रमात शारीरिक शिक्षणाचा समावेश करण्याच्या प्रमुख शिफारसी केलेल्या आहेत या समितीच्या शिफारशींमध्ये मध्यवर्ती संस्था म्हणजेच एक केंद्र संस्था सेंट्रल इन्स्टिट्यूट स्थापन करावीत असा असून यामध्ये शिस्त व अभ्यासक्रम हा शाळेमध्येच शारीरिक शिक्षणाच्या अभ्यासक्रमाच्या अविभाज्य भाग बनवावा अशी शिफारस करण्यात आली होती त्याचबरोबर शिक्षक प्रशिक्षण म्हणून शारीरिक शिक्षणासाठी योग्य आणि उच्च दर्जाचे प्रशिक्षण देणारी महाविद्यालये स्थापन करावीत व त्यांना विविध सुविधा व प्रोत्साहनात्मक शाळांना कॉलेजमध्ये खेळाची क्रीडांगणे खेळाच्या सुविधा त्याचबरोबर क्रीडा साहित्य व क्रीडा कौशल्य सुधारित प्रशिक्षकांची वाढ करण्यात यावी या समितीच्या मुख्य शिफारसी होत्या या समितीने देशातील शारीरिक शिक्षणा क्षेत्राचे अधोगतीस आलेले सर्व बदल मोडीस काढून एक सुधारणा घडवून आणण्याचा तसेच खेळाडूंना प्रोत्साहन देण्याचा पायाभूत शिफारशींच्या मागण्या केल्या.

१९५६ ते २०२५ राष्ट्रीय क्रीडा धोरणे व (२०४७) ची धोरणात्मक वाटचाल :

स्वतंत्र भारतामध्ये पूर्वी क्रीडा क्षेत्राकडे फक्त मनोरंजन या दृष्टिकोनातून पाहिले जात होते परंतु याची जडणघडण करत असताना यामध्ये क्रीडा राष्ट्रीय धोरणांचा समावेश करून याचा विकास घडविण्यात आला यामध्ये राष्ट्र उभारणीसाठी अत्यंत महत्त्वाचे टप्पे पुढीलप्रमाणे करण्यात आले

सुरुवातीचा काळ 1954 ते 1980

1954 ला भारतीय क्रीडा क्षेत्रामध्ये सर्वात मोठा मुलाखत बदल घडवण्यात आला तो म्हणजे.

ऑल इंडिया कौन्सिल ऑफ स्पोर्ट्स (ए आय सी एस)

ची स्थापना करण्यात आली ही भारतीय खेळ प्राधिकरण यांच्या अंतर्गत एक काम करणारी एक सर्वोच्च सल्लागार संस्था आहे याची स्थापना 1954 मध्ये झाली असून क्रीडा संस्कृती रुजवणे धोरण निर्मिती राष्ट्रीय क्रीडा महासंघांना एनएसएफ सहकार्य आणि क्रीडापटूंना पाठबळ देणे ही याची प्रमुख उद्दिष्टे आहेत ही खेळाच्या राष्ट्रीय आंतरराष्ट्रीय संघांना सल्ला देत असते त्याचबरोबर खेळाडूंची सुविधा व्हावी यासाठी निधी पुरवला जातो आणि क्रीडाविषयक धोरणांमध्ये मूल्यांकन करते त्याच बरोबर भारत सरकारने वेळोवेळी एआयसीएस चे पुनर्गठन करते ज्यात क्रीडापटू आणि तज्ञांचा समावेश केला जातो. ही एक समिती म्हणजे भारताच्या क्रीडा विकासासाठी धोरणात्मक सल्ला देणारी समिती आहे.

1956 ते 80 या काळामध्ये स्वतंत्र धोरण नव्हते मात्र 1982 आशियाई खेळांनी धोरणात्मक बदलांची गरज जाणून दिली यासाठी एनएसपी 1984 ला पहिले राष्ट्रीय क्रीडा धोरण लागू करण्यात आले यामध्ये प्रमुख उद्दिष्ट असा होता असेही खेळाच्या पहिले राष्ट्रीय क्रीडा धोरण जाहीर करून खेळाचे सार्वत्रिकरण करणे त्याचबरोबर क्रीडा क्षेत्राच्या पायाभूत सुविधांची निर्मिती करणे आणि खेळाडूंना शालेय शिक्षणाशी जोडण्यावर अत्यंत भर देणे ही या धोरणाची प्रमुख वैशिष्ट्ये होते त्याचबरोबर या धोरणाचे अंमलबजावणी ही भारतीय क्रीडा प्राधिकरण म्हणजे एस.ए. आय साईच्या अंतर्गत स्थापन करण्यात आली.

त्यानंतर 2001 मध्ये एन एस पी 2001 हे धोरण मागील काही धोरणांच्या कमतरतेमध्ये भर घालण्यासाठी व्यापक स्वरूपामध्ये स्थापित झाले यामध्ये खेळाचा विस्तार आणि उत्कृष्टता गाठणे हे दोन प्रमुख उद्दिष्ट साध्य करण्यासाठी या समितीची स्थापना करण्यात आली व ग्रामीण भागातील गुणवंत खेळाडू शोधणे आणि त्यांना आधुनिक क्रीडा विज्ञानाचा वापर आणि जागतिक स्तरावर पदके मिळवण्यासाठी सराव शिबिरांचे नियोजन करून देणे हा होता

त्यानंतर 2011 एन एस डी आय राष्ट्रीय क्रीडा विकास संहिता नुसार खेळाच्या संस्थांना एनएसएफ कामकाजात पारदर्शकता आणि उत्तरदायित्व आणण्यासाठी 2011 मध्ये ही संहिता लागू करण्यात आली यानुसार क्रीडा संस्थांच्या वरती कामकाज करत असताना पारदर्शकतेचे प्रमाण वाढले व खेळाडू साठी हे एक धोरण अमुलाग्र ठरले 2025 मध्ये नवीन राष्ट्रीय क्रीडा धोरण म्हणजे खेळो भारत नीती हे स्थापन करण्यात आले हे धोरण 1 जुलै 2025 रोजी केंद्रीय मंत्री मंडळाच्या ऐतिहासिक धोरणाचे मंजूरी होती 2001 च्या धोरणाची जागा याने घेतली.

याचे व्हिजन होते 2047 पर्यंत भारताला अव्वल पाच क्रीडा राष्ट्रांमध्ये स्थान मिळवून देणे याचे ध्येय आहे प्रमुख उद्दिष्ट 2036 ओलंपिक ऑलम्पिक साठी विविध आयोजनासाठी पाठबळ दावेदार बनवण्यासाठी लक्ष केंद्रित करणे त्याचबरोबर

डिजिटलायझेशन खेळो भारत प्लॅटफॉर्म सारखे खेळाडूंचा डेटा आणि सराव ट्रॅक तयार करणे यामध्ये प्रशासकीय सुधारणांचा ही समावेश करण्यात आला असल्याचा दिसून येतो ऑगस्ट 2025 मध्ये राष्ट्रीय क्रीडा प्रशासन कायदा 2025 लागू करण्यात आला ज्यामुळे क्रीडा संस्थांमध्ये अधिक व्यावसायिकता घडून आलेली दिसून येते या सर्वसामावेशकांचा महिला व दिव्यांग आणि आदिवासी खेळाडूंना विशेष तरतुदी ही करण्यात आल्या या तरतुदींमुळे दुर्गम भागातील आदिवासी समाजातील मुलांच्या सुप्त गुणांचा विकास करून क्रीडा क्षेत्रात या गुणांचा फायदा करून घेता येईल व देशासाठी आंतरराष्ट्रीय पदकांची कमाई करून घेता येईल हा होता त्याचबरोबर महिलांना सक्षमीकरण करून महिलांना पुरुषांच्या बरोबरीचा दर्जा उपलब्ध करून देणे असा होता व दिव्यांगांसाठी प्यारा ओलंपिक क्रीडा स्पर्धेचे आयोजन व त्या आयोजना संदर्भात त्या खेळाडूंना विशेष असे प्रशिक्षण व मार्गदर्शन पर सोयी सुविधांची उपलब्धता करून देणे हा होता.

१९४७ ते २०४७ पर्यंत च्या धोरणात्मक विकासाचे भारतीय शारीरिक शिक्षणातील प्रमुख टप्पे आणि योजना :

१) स्वतंत्र्योत्तर सुरुवातीचा काळ 1947 ते 1960:

भारताला स्वातंत्र्य मिळाल्यानंतर भारतामध्ये शारीरिक शिक्षणाला मनोरंजना पुरती मर्यादित न समजता शारीरिक शिक्षण हा एक राष्ट्रीय विकासाचा भाग आहे असे म्हणून स्वीकारले गेले.

यामध्ये ताराचंद कमिटी 1948 चा अभ्यास झाल्यानंतर 1948 लाच नॅशनल कॅडेट कॉर्प्स NCC म्हणजे युवकांमध्ये शिस्त आणि शारीरिक क्षमता विकसित करण्यासाठी या संस्थेची स्थापना करण्यात आली या अंतर्गत मुलांना सैन्यपूर्व प्रशिक्षणाच्या संदर्भातील कवायती व विविध शिस्तीच्या शिकवणी दिल्या जातात.

२) राजकुमारी अमृत कौर कोचिंग योजना 1953:

हे खेळाडूंना शास्त्र उत्तर प्रशिक्षण देणारी पहिली योजना आयोजित करण्यात आली

३) नॅशनल फिटनेस कॉर्प्स NFC(१९६५):

विविध योजनांचे एकत्रीकरण करून शारीरिक तंदुरुस्ती व शिस्तीचे आणि सेवा मूल्यांकनाचे आयोजनात्मक ही एक योजना सुरू करण्यात आली

४) आधुनिक आणि डिजिटल युग २००० ते २०२६

खेळो इंडिया कार्यक्रम २०१७-२०१८ या अंतर्गत तळागाळातील ग्रामीण भागातील खेळाडूंची गुणवत्ता व त्यांचे कौशल्य शोधून त्यावरती कार्य करून त्या खेळाडूंना अशी एक व्यासपीठ उपलब्ध करून देणे ज्यामध्ये खेळाडूंना आठ वर्षांपर्यंत वार्षिक पाच लाखाची शिष्यवृत्ती देण्यासाठी सुरुवात करण्यात आली त्याचबरोबर खेळो इंडिया वुमन्स गेम खेळो इंडिया युनिव्हर्सिटी गेम्स खेळो इंडिया नॅशनल गेम्स अशा विविध स्कीम्सची सुरुवात करण्यात आली

५) विकसित भारत २०४७ कडे वाटचाल:

उच्च व तंत्र शिक्षण विभागामार्फत शारीरिक शिक्षण हा एक सर्वांगीण विसरासाचा आराखडा आहे असे शिक्षणवेध २०४७ मध्ये उल्लेखनीत करण्यात आलेले आहे.

खेळो भारत नेते च्या अंतर्गत राष्ट्रीय उभारणीचा कणा म्हणून विकसित करण्याचे उद्दिष्ट आहे.

स्पर्धात्मक युगांमध्ये डिजिटलायझेशन व याचा वापर करून क्रीडा क्षेत्रातील कामगिरीमध्ये अमलावर बदल घडवून याचे कार्य २०२६ ते २०४७ पर्यंतचे टाग्रेट आहे.

भारतीय शारीरिक शिक्षणाच्या विकासासाठी विविध संस्था व संघटनांचा स्थापना व त्यांची कार्ये :

१) भारतीय क्रीडा प्राधिकरण:

उद्देश: भारतात क्रीडा संस्कृती रुजवणे आणि उत्कृष्ट खेळाडू तयार करणे हा आहे

कार्य: क्रीडा सुविधा पुरवणे प्रतिभा शोधणे आणि प्रशिक्षण शिबिरे आयोजित करणे हे साईचे कार्य आहे.

२) लक्ष्मीबाई राष्ट्रीय शारीरिक शिक्षण संस्था ग्वालियर: १९५६ स्थापना

वैशिष्ट्ये: शारीरिक शिक्षण आणि क्रीडा शास्त्रातील म्हणजेच सर्वोच्च संस्था याला न्याय डबल प्लस चे नामांकन प्राप्त आहे. शारीरिक शिक्षण शिक्षकांसाठी व मार्गदर्शकांसाठी या ठिकाणी अतिउच्च दर्जाचे शिक्षण दिले जाते.

३) नेताजी सुभाष चंद्र बोस राष्ट्रीय क्रीडा संस्था:

वैशिष्ट्ये ही एक भारतातील नव्हे तर आशिया खंडातील सर्वात मोठी क्रीडा संस्था आहे.

कार्य: ही भारतातील क्रीडा प्रशिक्षकांची निर्मिती करते त्याचबरोबर आधुनिक क्रीडा प्रशिक्षण प्रशिक्षकांना देते व खेळाडूंना ही पुरवले जाते उच्च दर्जाचे प्रशिक्षण देते ही संस्था साईच्या अंतर्गत कार्यरत आहे,

४) फिट इंडिया चळवळीची पार्श्वभूमी:

पंतप्रधान नरेंद्र मोदी यांनी २९ ऑगस्ट २०१९ रोजी (राष्ट्रीय क्रीडा दिनानिमित्त) या मोहिमेचा शुभारंभ केला. "जर शरीर तंदुरुस्त असेल, तर मनही तंदुरुस्त राहील," या विचारातून ही चळवळ सुरू झाली.

दैनंदिन फिटनेस: तंदुरुस्तीला लोकांच्या दैनंदिन जीवनाचा अविभाज्य भाग बनवणे.

वर्तणुकीत बदल: निष्क्रिय जीवनशैलीकडून सक्रिय जीवनशैलीकडे लोकांचे मत वळवणे.

देशाचा विकास: मधुमेह आणि उच्च रक्तदाबासारख्या जीवनशैलीशी संबंधित आजारांपासून नागरिकांचे संरक्षण करणे.

तळागाळापर्यंत पोहोच: शाळा, महाविद्यालये, पंचायती आणि गावांमधील प्रत्येक नागरिकाला या मोहिमेत सहभागी करून घेणे. आंतरराष्ट्रीय दर्जाचे खेळाडू घडवण्यासाठीची याची भूमिका ही प्रतिभा शोधणे पायाभूत सुविधा सुधारणे स्वदेशी खेळांना प्रोत्साहन देणे क्रीडा संस्कृती जपणे त्याचबरोबर प्रमुख उपकरण म्हणजे फिटनेस प्रोटोकॉल वयानुसार पाच ते अठरा वर्ष 18 ते 65 वर्षे व 65 वर्षा पुढील फिटनेससाठी मार्गदर्शन तत्त्वे जाहीर करणे फिटनेस की डोस आता घंटा रोज नागरिकांना दिवसातील किंवा 30 मिनिटे व्यायामासाठी प्रोत्साहित करणे फिट इंडिया स्कूल शाळांमध्ये फिटनेस उपक्रम राबवून मुलांमध्ये खेळाडूंची आवड निर्माण करणे असे विविध उपक्रम ह्या फिट इंडिया अंतर्गत घेतले जात होते

भारतातील शारीरिक शिक्षण क्रीडा विकासातील प्रमुख समस्या:

“थोडक्यात क्रीडा धोरणे, योजना व दृष्टीकोन प्रगत असले तरी अंमलबजावणी, पायाभूत सुविधा, प्रशिक्षित मनुष्यबळ, क्रीडा विज्ञानाचा प्रभावी वापर आणि सर्वसमावेशक क्रीडा संस्कृतीच्या अभावामुळे अपेक्षित क्रीडा महासत्ता होण्याच्या मार्गात अडथळे निर्माण होत आहेत.”

निष्कर्ष

स्वातंत्र्योत्तर काळापासून भारतामध्ये शारीरिक शिक्षण व क्रीडा क्षेत्राच्या विकासासाठी विविध समित्या, धोरणे, योजना आणि संस्था स्थापन करण्यात आल्या आहेत. ताराचंद समिती (1948) पासून ते *खेलो भारत नीती 2025* आणि *विकसित भारत 2047* या दृष्टीकोनापर्यंत भारताने क्रीडा व शारीरिक शिक्षणाच्या धोरणात्मक विकासात सातत्यपूर्ण प्रगती केली असल्याचे या अभ्यासातून स्पष्ट होते. शारीरिक शिक्षणाला राष्ट्रीय विकासाचा अविभाज्य घटक मानून त्याचा शालेय, महाविद्यालयीन आणि राष्ट्रीय स्तरावर विस्तार करण्याचा प्रयत्न करण्यात आलेला आहे. तथापि, अभ्यासातून असेही दिसून येते की राष्ट्रीय क्रीडा धोरणे व योजना प्रगत आणि दूरदृष्टीपूर्ण असल्या तरी त्यांची प्रत्यक्ष अंमलबजावणी तळागाळापर्यंत प्रभावीपणे होत नाही. केंद्र, राज्य आणि स्थानिक स्वराज्य संस्थांमधील समन्वयाचा अभाव, प्रशासकीय अडचणी आणि अपुरी देखरेख यांमुळे अनेक योजना केवळ कागदावरच मर्यादित राहिलेल्या आढळतात. विशेषतः ग्रामीण, दुर्गम आणि आदिवासी भागांमध्ये क्रीडांगणे, क्रीडा साहित्य आणि प्रशिक्षित प्रशिक्षकांचा अभाव प्रकर्षाने जाणवतो. याशिवाय, आधुनिक क्रीडा विज्ञान, क्रीडा अभियांत्रिकी, बायोमेकॅनिक्स, कृत्रिम बुद्धिमत्ता (AI) आणि डिजिटल तंत्रज्ञानाचा वापर अद्याप सर्वसमावेशक पद्धतीने झालेला नाही. प्रतिभा शोध, खेळाडूंचा दीर्घकालीन विकास आणि आंतरराष्ट्रीय स्तरावरील कामगिरी सुधारण्यासाठी वैज्ञानिक दृष्टिकोनाची अधिक गरज असल्याचे आढळून येते. आर्थिक असुरक्षितता, निवृत्तीनंतर रोजगाराची अनिश्चितता आणि मर्यादित प्रोत्साहन यामुळे अनेक गुणवंत खेळाडू क्रीडा क्षेत्रातून बाहेर पडतात. भारतीय शिक्षण व्यवस्थेत शारीरिक शिक्षणाला अजूनही दुय्यम स्थान दिले जाते. पालक, समाज आणि शैक्षणिक संस्थांचा दृष्टिकोन प्रामुख्याने शैक्षणिक यशापुरता मर्यादित असून क्रीडेला करिअर म्हणून स्वीकारण्याची मानसिकता अपेक्षित प्रमाणात विकसित झालेली नाही. तसेच काही क्रीडा संघटनांमधील अपारदर्शक प्रशासन, राजकारण आणि गटबाजी यामुळे खेळाडूंच्या विकासावर प्रतिकूल परिणाम होत असल्याचे निदर्शनास येते. एकंदरीत, भारताकडे सक्षम क्रीडा धोरणे, विशाल युवक लोकसंख्या आणि प्रचंड क्रीडा क्षमता असली तरी प्रभावी अंमलबजावणी, संतुलित पायाभूत सुविधा, प्रशिक्षित मनुष्यबळ, क्रीडा विज्ञानाचा व्यापक वापर आणि सर्वसमावेशक क्रीडा संस्कृतीच्या अभावामुळे भारताच्या क्रीडा महासत्ता होण्याच्या वाटचालीत अडथळे निर्माण होत आहेत. *विकसित भारत 2047* हे ध्येय साध्य करण्यासाठी शारीरिक शिक्षण व क्रीडा क्षेत्रात धोरण आणि अंमलबजावणी यांमधील दरी भरून काढणे, तळागाळातील प्रतिभेला समान संधी देणे आणि क्रीडेला राष्ट्रीय चळवळीचे स्वरूप देणे अत्यावश्यक आहे.

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Challenges Before Teachers in Transforming Higher Education Through NEP 2020**Mr. Jayvant Babaso Khot**

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Abstract:

The Government of India has determined to implement the National Education Policy 2020 (NEP 2020), which was approved by the Union Cabinet on 29 July 2020, across the country. Himachal Pradesh has become the first state to implement this new policy. Mr. Chandrakant Patil, the Minister of Education, Maharashtra has given directives to the universities and colleges in the state of Maharashtra to implement the National Education Policy 2020 from the academic year 2024-25. Karnataka has become the first state to implement NEP 2020 in higher education. The new policy aims to change education system completely in India. The role of the teachers will be paramount in the process to bring about change in higher education in our country. The present research article is an attempt to find out probable challenges before the teachers in transforming higher education through the National Education Policy 2020.

Keywords: National Education Policy 2020, NEP-2020, Higher Education, Teacher, Challenges, HEI's

Introduction:

The arrival of the British in India opened the doors of education to the masses, though they wanted Indians in their civil services. A lot of change took place in the field of education, especially after independence. The University Education Commission was formed in 1948. It was chaired by Dr. Sarvpalli Radhakrishnan, who proposed higher education and the creation of universities in the country. After this commission, so many changes took place in the education sector, such as the right to education, the girls' hostel scheme, and Beti Bachao Beti Padhao Abhiyan, which changed the face of the country.

One more step has been taken by the central government to transform the entire education system. The Government of India has launched a new education policy, i.e., the National Education Policy 2020, after accepting the report of the committee formed to launch the new policy in the country. Finally, on 29 July 2020, the Government of India approved the new policy in the country. NEP 2020 focuses on developing cognitive skills, critical thinking, cultural awareness, empathy, perseverance, and leadership in students at the school level.

In higher education, NEP 2020 provides valuable insights and recommendations on various aspects of education that include moving towards multidisciplinary and holistic education. The policy is expected to have a long-lasting positive impact on the education system and make India a global hub of skilled manpower during the "Amrit Kaal," the next 25 years leading up to a developed India in 2047.

Aims and Objectives:

1. To understand the National Education Policy 2020
2. To know higher education framework
3. To explore teacher education framework
4. To study probable challenges before the teachers in higher education

Hypothesis:

Teachers in higher education will encounter challenges in transforming the education field through the new National Education Policy 2020.

Research Methodology:

The present researcher has used theoretical and descriptive methods to carry out research. Along with primary data, secondary sources such as journals, research articles, news, and website contents have been used.

Analysis:**NEP 2020: At a Glance**

The central government of India has approved a new policy in education, replacing the earlier one from 1986. This new policy is the National Education Policy 2020. The NEP 2020 has been finalized after deep study and over two lakh suggestions from 2.5 lakh grampanchayats and more than 6,000 blocks. It aims to increase expenditure on education from around 3% to 6% of the GDP. The policy recommends native languages for the students. Not even a single language will be imposed on them. The “10+2” structure will be replaced by the “5+3+3+4” model. The focus will be on the mental health of the students through the deployment of counselors and social workers.

Higher Education Framework:

According to the NEP 2020, the degree program will be four years of multidisciplinary study with multiple entry and exit points. Students will get a certificate after completing 1 year of study, a diploma after completing 2 years of study, a bachelor's degree after completing a 3-year program, and a 4-year multidisciplinary bachelor's degree. Master of Philosophy courses will be discontinued. A Higher Education Commission of India (HECI) will regulate higher education in the country. It will replace NCTE, AICTE, and UGC by the National Higher Regulatory Council (NHERC), the National Accreditation Council (NAC)) and the Higher Education Grants Council (HEGC). The National Testing Agency will shoulder the responsibility of conducting entrance examinations for admissions to universities across the country.

Teacher Education Framework:

Teacher education is very important to shape the next generation; hence, the present policy places special stress on teachers multidisciplinary inputs, high-quality content, and pedagogy. To this end, multidisciplinary universities and colleges will aim to run B.Ed. programs in collaboration with other departments such as Psychology, Sociology, Philosophy, Neuroscience, Arts, Music, History, Literature, Indian languages, Science, Physical Education, and Mathematics. The 4-year integrated B.Ed. offered by such multidisciplinary higher education institutes (HEI) will, by 2030, become the minimal degree qualification for school teachers. The HEI offering a 4-year B.Ed. may also run a 2-year B.Ed. for students who have already received a bachelor's degree in a specialized subject. A 1-year B.Ed. may also be offered for candidates who have received a 4-year undergraduate degree in a specialized subject.

All fresh Ph.D. entrants, irrespective of discipline, will be required to take credit-based courses in teaching, education, pedagogy, or writing related to their chosen Ph.D. subject during their doctoral training period. Ph.D. students will also have a minimum number of hours of actual teaching experience gathered through teaching assistantships and other means. Ph.D. programs at universities around the country will be reoriented for this purpose.

Challenges before Teachers:

Teachers at school and HEI's will play a vital role in making the new NEP 2020 successful. As after going through the draft of the policy, one can realize this policy expects to change the prevalent education system and approach Indian values, traditions, and cultures that once Naland and Takshshila rendered to the world. In short, Indian education is on the path of multidisciplinary education. For this sort of system, the teacher must be strong. Hence, the NEP 2020 has suggested changes in teacher education programs. It is important to discuss challenges that are posed before faculty in HEI's.

1.Multidisciplinary Perspective :

Teachers at colleges and universities need to be multidisciplinary in perspective because specialization in a single subject will harm them. They must impart knowledge from every stream. It will be a big challenge for the teachers to keep themselves updated. Teachers should read widely and cultivate a research-oriented

approach regarding all the subjects of the social and physical sciences. Multidisciplinary practice can be seen clearly in Indian values and cultures. Teachers should try to be competent, experienced, and multitalented in the current education system.

2. Research- Oriented Perspective:

The new NEP 2020 expects research-oriented faculty in higher education. Teachers are expected to keep pace with the changing world. Teachers should look at the fast-changing things in the world and consider them a challenge. A teacher can encourage and inspire students to adapt to new things happening in the world. According to NEP 2020, professors and associate professors need to publish at least two research articles in indexed Scopus journals per year. An assistant professor should publish at least one research article in an indexed Scopus journal.

3. Proficiency in Technology:

Teachers must know the function and operation of currently available technology and the applications of that technology. It can be a challenge for those who are not techno-savvy in the use of modern technology, especially computers and laptops. Technology proficiency refers to the ability of teachers to identify and explore a wide variety of technological tools and devices in order to determine and select those that best respond to teaching and learning content. Therefore, teachers must be able to apply the technological knowledge and skills required in professional job roles and responsibilities in order to achieve the expected outputs of NEP 2020.

4. Changes in Pedagogy:

Novel ideas in pedagogy is one of the challenges before the faculty of higher education. Because NEP 2020 has suggested several new methods of teaching, It's not going to be easy to adopt a holistic approach while dealing with students in HEIs, especially for those teachers who are accustomed to old methods of delivering lectures. So, this shift from old methods to modern scenarios may prove a problem for teachers and students.

5. Infrastructure and Facilities:

There are a number of colleges in Maharashtra that are run on a non-grant basis and lack good infrastructure and facilities. UGC has given orders to get accredited by NAAC. Many colleges are not even eligible for accreditation, which is a worse thing. How can teachers work devotedly in colleges where there are no facilities at all? There are no technical tools or equipment available for the teachers with which they can teach students, as per the recommendations of the new NEP 2020. This is a tough challenge to overcome, not only in Maharashtra but also in other states of the country.

6. Lack of Recruitment:

Thousands of posts for teachers in universities and colleges around the country are vacant. In February 2023, the Minister of Education informed the House of Lok Sabha that 14600 posts of teachers are vacant in HEI's managed by the Central Government. It is challenging for the rest of the of the faculty to teach the students with the burden of additional responsibilities. In Maharashtra, 60% of faculty positions are vacant in universities and affiliated colleges. Two CHB teachers are appointed for one full-time post on scanty remuneration. One CHB teacher is not paid more than 1.5 lakh per year, which is horrible. How can the government expect CHB teachers to transform higher education thoroughly? This is a huge challenge for CHB teachers to develop students holistically because they can't afford the technical tools to buy and invent innovative technical methods for teaching.

Conclusion:

After the analysis of the new National Education Policy 2020, it is clear that this policy poses difficulties and challenges for faculty working at HEIs. For teachers, there are a lot of problems in transforming higher education, like the need for substantial investment in education, changes in pedagogy, the lack of adequate infrastructure and resources, the exiguous honorarium for irregular teachers, etc.

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UGC's Equity Regulations : A Step Towards Social Inclusion**Mr. Nikhil Suhas Raut**Assistant Professor of Political Science,
Devchand Mahavidyalaya,
Arjunnagar.Email : nikhilraut2556@gmail.com**Abstract**

Viksit Bharat is a vision of Indian Govt. which aims the transform India into a fully developed country by the year 2047. The initiative aims to achieve inclusive and sustainable development, leveraging India's strength in technology, human capital, economic growth and cultural heritage. The pillars of Viksit Bharat are Youth, Poor, Women and Farmers. One of the objectives of Viksit Bharat is to ensure social equity and social inclusion. The Govt. wants to ensure effective equitable access to quality education. In this backdrop, it is imperative to throw light on UGC's Equity Regulation 2026, which is a welcome reform. The UGC notified revised anti-discrimination regulation on 13th January, 2026, which made the HEI's obligatory to form and strengthen 'Equal Opportunity Centres' to work effectively to safeguard institutional protection of the SC, ST and OBC categories. The new regulations replace the UGC (Promotion of Equity in HEI's) 2012, which was largely in advisory nature. Some elite groups raised their protests arguing that the new regulations effectively deny institutional protection and grievance redressal to individuals belonging to non-reserved categories. However, the civil society groups and political organizations emphasize that these anti-discrimination regulations would ensure substantive social inclusivity. They stress that the regulations are a substantive policy reform which indicates Govt.'s greater accountability toward social transformation and social justice agenda.

Key-words :institutional protection, anti-discrimination, substantive reform, social equity, accountability, social transformation.

Introduction :

Viksit Bharat is a vision of the Govt. of India to make India a developed nation by 2047, an ambitious target to mark hundredth anniversary of India's independence. The initiative aims to achieve inclusive and sustainable development, leveraging India's strength in technology, human capital, economic growth and cultural heritage. The pillars of Viksit Bharat are centred around Yuva (Youth), Garib (Poor), Mahila (Women) and Annadata (Farmers). It aims to empower young generation, to improve the lives of the underprivileged, to enhance opportunities and rights of women and supporting and lifting farmers' lives. One of the key-objectives of Viksit Bharat is to ensure social equity and social inclusion. In order to achieve this objective, the Govt. wants to ensure equitable access to quality education and healthcare and safeguard the rights of differently-abled individuals. In the backdrop of this objective, it would be a welcome move to throw light on UGC's Equity Regulations 2026, which is a necessary step towards ensuring social equity and inclusion.

UGC's Equity Regulations 2026 :

The University Grants Commission notified its revised anti-discrimination regulations on 13th January, 2026. As per the provisions laid down in UGC's Equity Regulations (Promotion of Equity in Higher Education) Regulations 2026, it made the HEI's mandatory to appoint the members of the Other Backward Classes (OBC's), the Scheduled Castes (SC's) and Scheduled Tribes (ST's) persons with disabilities and women on these committees. This Equity Regulation Bill replaced the Regulation, 2012 framework, which was in advisory nature. The new regulations appeared to be a significant and democratic step towards substantive justice. However, these regulations have faced sporadic protests from some elite groups who argue that, they will aggravate caste divisions and may be misused to file false complaints against general category students.

A plea was filed in the Supreme Court by one Vineet Jindal challenging a recently notified UGC regulation. In his plea he alleged that, it has adopted a non-inclusionary definition of caste-based discrimination and excludes certain categories from institutional protection. Addressing the plea filed in the Supreme Court Bench of C.J.I. Surya Kant and Justice Jaymala Bagchi have put the equity measures in abeyance calling them “Vague” and “too sweeping” till the further hearing in March, 2026. In order to understand such opposition from the “elite” groups, we have to trace back the genesis of the unrest that took place after the implementation of the Mandal Commission.

The Mandal Factor :

The first Backward Class Commission (1953) was formed under the Chairmanship of Kakasaheb Kalelkar, whose report didn't see the light of the day. Then second Backward Class Commission, popularly known as Mandal Commission was formed in 1979 during the regime of PM Moraraji Desai under the Chairmanship of B. P. Mandal. It submitted its report in 1980 stating that a large part of the population is deprived of benefits, respects, rights education and employment due to caste discrimination. It recommended 27% reservation for the Other Backward Classes (OBC's), which came into force in 1990. It was followed by demonstrations and self-immolations, strikes all over the country. The issues of quality or social justice were brought at the centerstage for the first time. The Supreme Court accorded the constitutional status to the recommendations, but in the case of Indra Sawhney delimited the reservation quota upto 50% and introduced the concept of “creamy layer” leaving a large part of population deprived. The issues of quality or social justice remained unanswered since then. Many individuals were benefitted by the Mandal recommendations. However, this fight remained incomplete with the growing divide and race competitions. As a result, the new UGC Equity Resolutions gave birth to the unrest among the elite social groups.

Demand for a Substantive Constitutional Mechanism :

Since the death of Rohit Vemula, at Hyderabad University, on 17th January, 2016 and a Post-graduate Medical Student, Payal Tadavi in Mumbai University, in 2019 civil society groups and political organizations have consistently demanded the strict implementation of the provisions of law. Therefore, the UGC (Promotion of Equity in HEI's) Regulations, 2012 were strengthened in 2026 with a view to prevent discrimination based on castes and classes. It showed the failure of the system to safeguard the rights of the low-caste students. It highlighted the fact that, the entry of Dalit, Bahujan and Adivasi (DBA) students in Education doesn't guarantee 'equality' and 'equal opportunity'. Their historical marginalized social status and modest economic conditions hampered their robust participation in academic institutions. The social-elite groups denied to treat them as equals and practiced exclusions such as a student changing hostel to avoid a Dalit roommate or a professor giving minimum marks to a Dalit student in viva-voce exam. This exclusion operated through structural failures such as non-fulfillment of reserved quotas in administration, faculty recruitment and administrative positions. So the Supreme Court of India ordered to revise the procedures during the hearings of the pending cases. Therefore, the UGC clearly spelt out the new procedures for the (Promotion of Equity in Higher Education) Regulations, 2026.

UGC's New Equity Regulations is a welcome step to create spaces for social transformation. As per the provisions laid down in the new regulations, all the Higher Education Institutions (HEI's) are mandated to form “Equal Opportunity Centres”, “Equity Committee” and “Grievance Redressed Cell” operating within their purview. It is directed that, these committees will address the discrimination complaints in time bound manner. To implement the objective of these regulations, every higher education institution is mandated to have an Equal Opportunity Centre, an Equity Committee and Equity Squads. Let's look at these one by one.

Equal Opportunity Centre :

The Equal Opportunity Centre (EOC) will oversee the implementation of policies related to disadvantaged groups, coordinate with the district administration and police and help provide legal aid when necessary.

These EOC's will have five faculty members from the institution. There is no reservation for any category for these five members. The regulations state that, if a college does not have at least five faculty members to establish an EOC, its functions shall be performed by the EOC of the university itself to which the college is affiliated.

Equity Committee :

The EOC will have a ten member Equity Committee chaired by the head of the institution. Five of its members must be from reserved categories - Other Backward Classes, Persons with Disabilities, Scheduled Castes, Scheduled Tribes and Women. It is to meet within 24 hours to address complaints, and submit its report to the head of the institutions in 15 days. In turn, the head of the institution is to initiate action within seven days.

Equity Squads :

These are to be constituted to "maintain vigil and prevent discrimination on campus". They are to "remain mobile and visit vulnerable spots frequently." Institutions will also have a 24 hour "Equity Helpline" to report incidents of discrimination. They must appoint Equity Ambassadors who will work as "torch bearers" of equity.

The policy would not be operating as the directive principle, and the HEI's failing to comply with the procedures shall be penalized - the UGC can debar them from participating in the commission's schemes, from offering degree programmes and online programmes, or remove the institution from the list of those that are eligible to receive central grants. The HEI's shall ensure that, the new regulations to check caste-bias would not be 'misused' and there would be no discrimination with anyone as students.

However, these regulations have given rise to the protests from some social elite groups. They argue that, it would accelerate caste-divisions. They apprehend that, the new regulations may be used to file false complaints against general category students. They emphasize that, the Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989 is sufficient to deal with caste discrimination. Their only objection is to the Regulation 3 (1) (c) which defines caste based discrimination as discrimination only against the members of SC, ST and OBC. They express their apprehensions that, the students belonging to non-reserved categories will be targeted by making false complaints against them. They stress that, by limiting the scope of "Caste-based discriminations" only to SC, ST and OBC categories, the UGC effectively denied institutional protection and grievance redressal to individuals belonging to the non-reserved categories who may also face harassment or bias based on their caste identity. The protesting groups argue that there is no provision for penalties in the case of a false complaints of discrimination and that institutions can be subjected to action for not complying with the regulations.

Conclusion :

However, the new regulations must be welcomed for the crucial shift they mark. Universities are not only the centres of learning and knowledge but also the places of social transformation. It should be noted that, ending caste-discrimination is not just a legal obligation, but a moral imperative. If grievance mechanism expected to be effectively implemented, it must be accompanied by serious engagement with anti-caste knowledge, curricular accountability and structural harm. Only then and then the UGC regulation would be a substantive reform, showcasing Govt.'s greater accountability towards the social justice agenda. It would be an effective instrument to end discrimination and ensure social inclusion to visualize India as Viksit Bharat by the year 2047.

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स्थानिक स्वराज्य संस्थांचे विकसित भारतातील योगदान विकसित भारत २०४७ च्या दृष्टीने

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प्रस्तावना

भारत हा लोकसंख्येने व क्षेत्रफळाने विशाल असलेला देश आहे. स्वातंत्र्यप्राप्तीनंतर भारतीय घटनेने आपल्या देशासाठी संसदीय लोकशाहीची पद्धत स्वीकारली. भारत हा जगातील सर्वात मोठ्या लोकसंख्येचा लोकशाही देश आहे. भारतीय लोकशाही दर पाच वर्षांनी होणाऱ्या निवडणुकांपुरती मर्यादित नसून ती जनतेचा सहभाग, सरकार व जनता यांच्यातील संवाद आणि उत्तरदायित्व यावर आधारलेली शासन पद्धती आहे.

भारतात संघराज्य शासन पद्धती अस्तित्वात आहे. केंद्र शासनासाठी मध्यवर्ती सरकार व घटक राज्यांसाठी राज्य सरकारे अस्तित्वात आहेत. ही सरकारे देशासाठी कायदे तयार करणे, देशाचे संरक्षण करणे, देशाचे परराष्ट्र धोरण ठरवणे अशी कामे करतात. मात्र केंद्र व राज्य सरकारांच्या स्तरावर नागरिकांना थेट सहभाग घेता येत नाही आणि स्थानिक समस्यांचे निराकरण येथे होऊ शकत नाही.

भारतासारख्या विशाल देशात केंद्र व राज्य शासन सर्व समस्या प्रभावीपणे सोडवू शकत नाहीत. त्यामुळे लोकशाहीचे विकेंद्रीकरण करणे महत्त्वाचे ठरते. केंद्रीय योजना तळागाळातील लोकांपर्यंत पोहोचवण्यासाठी व त्यांना राज्यकारभारात प्रत्यक्ष सहभागी करून घेण्यासाठी ७३ वी व ७४ वी घटनादुरुस्ती १९९२ मध्ये करण्यात आली. या घटनादुरुस्तीने स्थानिक स्वराज्य संस्थांना घटनात्मक दर्जा देण्यात आला. आज विकसनशील भारताला २०४७ पर्यंत विकसित भारत बनवण्यासाठी स्थानिक स्वराज्य संस्थांची भूमिका निर्णायक ठरणार आहे.

या संशोधन निबंधात स्थानिक स्वराज्य संस्थांचे देशाच्या सामाजिक, आर्थिक व राजकीय विकासातील योगदान, महिलांचा व युवकांचा सहभाग, आव्हाने व सुधारणा यांचा सविस्तर आढावा घेण्यात आला आहे.

संशोधनाची उद्दिष्टे

- ७३ वी व ७४ व्या घटनादुरुस्तीनुसार स्थानिक स्वराज्य संस्थांचे भारताच्या विकासातील योगदान स्पष्ट करणे.
- भारताच्या आर्थिक विकासातील स्थानिक स्वराज्य संस्थांची भूमिका स्पष्ट करणे.
- जागतिकीकरणाच्या पार्श्वभूमीवर स्थानिक स्वराज्य संस्थांसमोरील वाढती आव्हाने स्पष्ट करणे.

संशोधन पद्धती : या संशोधन लेखासाठी मिश्र (संख्यात्मक व गुणात्मक) संशोधन पद्धतीचा अवलंब करण्यात आला आहे. तसेच सदर संशोधन लेखासाठी वर्णनात्मक संशोधन रचणेचा वापर करण्यात आला आहे. भारतीय राज्यघटना, ७३ वी व ७४ वी घटनादुरुस्तीसंदर्भात राज्य सरकारांचे अहवाल, संदर्भ ग्रंथ, वर्तमानपत्रे व नियतकालिके यांचा दुय्यम स्रोत म्हणून वापर करण्यात आला आहे.

ऐतिहासिक पार्श्वभूमी : भारतात स्थानिक स्वराज्य संस्थांची संकल्पना प्राचीन काळापासून अस्तित्वात होती. ग्रामसभेद्वारे स्थानिक पातळीवर निर्णय घेतले जात होते. ब्रिटिश गव्हर्नर लॉर्ड रिपन यांनी १८८३ साली स्थानिक स्वराज्य संस्थांचा कायदा मंजूर केला होता. लॉर्ड रिपन यांना भारतीय स्थानिक स्वराज्य संस्थांचे जनक म्हणून संबोधले जाते.

स्वातंत्र्यानंतर देखील भारतात स्थानिक स्वराज्य संस्था अस्तित्वात होत्या, मात्र त्यांना घटनात्मक दर्जा नसल्याने त्यांच्या सर्व तरतुदींची प्रभावी अंमलबजावणी होत नव्हती. बलवंतराव मेहता समिती (१९५७) व अशोक मेहता समिती

(१९७८) यांनी केलेल्या शिफारशीनुसार पंचायत राज व्यवस्थेला चालना मिळाली. यांच्या शिफारशीच्या आधारावर १९९२ साली ७३ वी व ७४ वी घटनादुरुस्ती कायदा मंजूर झाला आणि स्थानिक स्वराज्य संस्थांना घटनात्मक दर्जा प्राप्त झाला.

७३ वी व ७४ वी घटनादुरुस्ती : ठळक वैशिष्ट्ये

७३ व्या घटनादुरुस्तीने ग्रामीण भागांमध्ये ग्रामपंचायत, पंचायत समिती व जिल्हा परिषद अशा त्रिस्तरीय पंचायत राज संस्था स्थापन केल्या गेल्या. त्याचप्रमाणे ७४ व्या घटनादुरुस्तीने शहरी भागांमध्ये नगरपंचायत, नगरपालिका व महानगरपालिका स्थापन करण्यात आल्या. या घटनादुरुस्तीची ठळक वैशिष्ट्ये पुढीलप्रमाणे आहे.

- राज्य निवडणूक आयोग व राज्य वित्त आयोगाची तरतूद
- अनुसूचित जाती, जमाती व महिलांसाठी आरक्षण
- अकरावी व बारावी अनुसूची जोडण्यात आली
- प्रभाग समित्या व ग्रामसभेची तरतूद करण्यात आली

विकसित भारत २०४७ व स्थानिक स्वराज्य संस्थांची भूमिका

विकसित भारत २०४७ ची संकल्पना केवळ आर्थिक प्रगतीपुरती मर्यादित नसून सामाजिक न्याय, राजकीय स्थैर्य, जनतेचा प्रशासनातील सहभाग यांच्यातील समन्वयाला सांगते. भारताला विकसनशील राष्ट्रातून विकसित राष्ट्राकडे नेण्यासाठी विकासाचा पाया मजबूत व सर्वसमावेशक असणे आवश्यक आहे. देशाचा सर्वसमावेशक विकास हा स्थानिक स्वराज्य संस्थांद्वारे प्रभावीपणे साध्य केला जाऊ शकतो.

- १. लोकशाहीचे विकेंद्रीकरण व तळागाळातील सहभाग :** भारत लोकसंख्येने मोठा असलेला देश आहे. केंद्रीय व राज्य कायदेमंडळातील मर्यादित जागांमुळे सर्वसामान्य जनतेला प्रतिनिधित्व मिळणे कठीण आहे. मात्र त्रिस्तरीय स्थानिक स्वराज्य संस्थांमध्ये तळागाळातील नागरिकांनाही प्रतिनिधित्व करण्याची संधी मिळते. त्यामुळे लोकशाहीचे विकेंद्रीकरण होते आणि स्थानिक पातळीवरील लोकांचा सहभाग वाढल्यामुळे विकासांमध्ये पारदर्शकता व जबाबदारी निर्माण होते.
- २. युवकांचा सहभाग व उद्योजकता :** युवक हे देशाचे भविष्य आहेत आणि स्थानिक स्वराज्य संस्थांमध्ये युवकांचा सहभाग विकसित भारतासाठी अत्यंत महत्त्वाचा आहे. युवकांसाठी कौशल्य विकास, उद्योजकता, स्वयंरोजगार, स्टार्टअप यांना प्रोत्साहन देऊन देशाचा विकासदर वाढवता येतो. स्थानिक पातळीवर युवकांना नेतृत्वाची संधी मिळते आणि त्यांच्यामध्ये राजकीय जागरूकता निर्माण होते.
- ३. महिला सशक्तीकरण व सामाजिक समता :** स्थानिक स्वराज्य संस्थांमध्ये महिलांना ३३% (काही राज्यांत ५०%) आरक्षण देण्यात आले आहे. त्यामुळे महिलांचा राज्यकारभारातील सहभाग मोठ्या प्रमाणात वाढला आहे. आरोग्य, शिक्षण, पाणीपुरवठा, स्वच्छता यांसारख्या विषयांना आता प्राधान्य मिळत आहे. त्याचप्रमाणे अनुसूचित जाती-जमाती व इतर मागासवर्गांना प्रतिनिधित्व मिळाल्याने सामाजिक न्याय व समावेशकतेला चालना मिळाली आहे.
- ४. ग्रामीण व शहरी विकास आणि रोजगार निर्मिती :** ग्रामीण व शहरी विकासासाठी स्थानिक स्वराज्य संस्था रोजगाराला चालना देऊ शकतात. ग्रामीण भागात कृषी, पूरक उद्योग, पशुसंवर्धन, मत्स्यव्यवसाय, लघुउद्योग, स्वयंरोजगार योजना तर शहरी भागात कौशल्य विकास, स्टार्टअप, सेवा क्षेत्र यांना प्रोत्साहन देता येते. स्थानिक स्तरावर रोजगाराच्या संधी उपलब्ध झाल्यास ग्रामीण स्थलांतर कमी होईल व ग्रामीण अर्थव्यवस्था मजबूत होईल.
- ५. उत्तरदायित्व, पारदर्शकता व भ्रष्टाचार निर्मूलन :** स्थानिक स्वराज्य संस्थांमध्ये जनता प्रत्यक्ष सहभागी होते व ते प्रशासनाला राज्यकारभारविषयी प्रश्न विचारतात. त्यामुळे प्रशासनाचे उत्तरदायित्व वाढते. प्रशासनाला जनतेला विश्वासात घेऊन काम करावे लागते. लेखापरीक्षण व ग्रामसभा यांमुळे भ्रष्टाचाराला मोठ्या प्रमाणात आळा बसतो. सामाजिक अंकेक्षण (Social Audit) ही प्रक्रिया पारदर्शकता आणण्यास मदत करते.

६. **शहरी विकास व पायाभूत सुविधा** : देशात मोठ्या प्रमाणात होत असलेल्या शहरीकरणामुळे शहरी भागात रस्ते, ड्रेनेज, कचरा व्यवस्थापन, सार्वजनिक वाहतूक, पाणीपुरवठा यांसारखे प्रश्न उद्भवतात. महानगरपालिका व नगरपालिका या सेवा पुरवून शहरी जीवनाचा दर्जा उंचवतात. देशाच्या विकासात स्वच्छ व प्रगत शहरांचे योगदान महत्त्वाचे ठरते. स्मार्ट सिटी, स्वच्छ भारत अभियान यांसारख्या योजनांची अंमलबजावणी स्थानिक स्वराज्य संस्थांद्वारेच होते.

७. **राजकीय जागरूकता व नेतृत्व विकास** : स्थानिक स्वराज्य संस्था लोकशाहीला तळागाळापर्यंत पोहोचवतात. ग्रामसभेद्वारे नागरिक थेट निर्णय प्रक्रियेत सहभागी होतात. यामुळे राजकीय जागरूकता वाढते व नेतृत्व विकसित होते. स्थानिक प्रश्न स्थानिक पातळीवर सोडवले जात असल्याने लोकशाही अधिक अर्थपूर्ण बनते. देशात सामाजिक समता, दुर्बल घटकांचे सशक्तीकरण व सर्वसमावेशक विकास साधण्यासाठी स्थानिक स्वराज्य संस्थांचा मोठा वाटा आहे.

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१. **आर्थिक स्वायत्ततेचा अभाव** : स्थानिक स्वराज्य संस्थांकडे पुरेशा आर्थिक साधनांचा अभाव असल्याने विकास प्रक्रियेत अडथळा निर्माण होतो. बहुतेक स्थानिक स्वराज्य संस्था राज्य व केंद्र सरकारच्या अनुदानावर अवलंबून असतात. स्वतःचे महसूल स्रोत मर्यादित असल्याने त्यांची आर्थिक क्षमता कमी राहते.
२. **प्रशासकीय क्षमतेचा अभाव** : अनेक निवडून आलेल्या प्रतिनिधींना योग्य प्रशिक्षण व तांत्रिक ज्ञान नसल्याने प्रशासकीय कार्यक्षमता प्रभावित होते. प्रशासकीय अधिकाऱ्यांची कमतरता देखील एक मोठी अडचण आहे.
३. **राजकीय हस्तक्षेप** : स्थानिक स्वराज्य संस्थांवर राज्यस्तरीय व राष्ट्रीय राजकारणाचा मोठा प्रभाव असतो. पक्षीय राजकारणामुळे स्थानिक विकास प्रश्नांना प्राधान्य मिळत नाही. निवडलेल्या प्रतिनिधींचे अयोग्य हस्तक्षेप देखील कार्यक्षमतेवर परिणाम करतात.
४. **जनजागृतीचा अभाव** : ग्रामीण व अशिक्षित लोकांमध्ये स्थानिक स्वराज्य संस्थांबाबत जागरूकता कमी आहे. ग्रामसभांमध्ये सहभाग कमी असल्याने योजनांची प्रभावी अंमलबजावणी होत नाही.

सुधारणा व उपाय योजना

- स्थानिक स्वराज्य संस्थांना आर्थिक व प्रशासकीय स्वायत्तता देणे गरजेचे आहे. राज्य वित्त आयोगाने केलेल्या शिफारशींची प्रभावी अंमलबजावणी करणे आवश्यक आहे.
- निवडून आलेल्या प्रतिनिधींना योग्य प्रशिक्षण व क्षमतावर्धन कार्यक्रम उपलब्ध करून द्यावेत. तांत्रिक मार्गदर्शन व मदत पुरवावी.
- पक्षीय राजकारणापेक्षा स्थानिक विकास प्रश्नांना प्राधान्य देणे गरजेचे आहे. स्थानिक प्रश्नांच्या चर्चेसाठी सतत ग्रामसभा व जनता दरबार घेणे आवश्यक आहे.
- स्थानिक स्वराज्य संस्थांची कामगिरी मोजण्यासाठी योग्य निकष ठरवावेत व त्यांचे वेळोवेळी मूल्यमापन व्हावे. उत्तम कामगिरी करणाऱ्या संस्थांना प्रोत्साहन व्हावे.
- तंत्रज्ञानाचा वापर करून प्रशासनात पारदर्शकता आणणे, ई-गव्हर्नन्स व डिजिटल प्लॅटफॉर्मद्वारे जनतेशी संवाद साधणे आवश्यक आहे.
- जनजागृती मोहिमा राबवून ग्रामसभांमध्ये नागरिकांचा सहभाग वाढवावा. महिलांना व युवकांना राज्यकारभारात अधिक सक्रिय सहभागासाठी प्रोत्साहन द्यावे.

निष्कर्ष

स्थानिक स्वराज्य संस्था भारतीय लोकशाहीचा कणा आहेत. लोकशाहीचे विकेंद्रीकरण, सामाजिक न्याय, समावेशकता व सर्वांगीण विकास साधण्यासाठी त्यांची भूमिका अप्रतिम आहे. ७३ वी व ७४ व्या घटनादुरुस्तीमुळे स्थानिक स्वराज्य संस्थांना घटनात्मक बळकटी मिळाली असली तरी आर्थिक, प्रशासकीय व राजकीय अडचणी अजूनही आहेत.

योग्य सुधारणा, सक्षम नेतृत्व, जनजागृती व तंत्रज्ञानाच्या माध्यमातून स्थानिक स्वराज्य संस्था विकसित भारत २०४७ च्या दृष्टीने महत्त्वपूर्ण भूमिका बजावू शकतात. तळागाळातील लोकशाही मजबूत झाली तरच भारत खऱ्या अर्थाने विकसित राष्ट्र म्हणून जगासमोर उभा राहील. ग्रामपंचायतीपासून ते महानगरपालिकेपर्यंतच्या प्रत्येक स्तरावर जनतेचा सहभाग, पारदर्शकता व जबाबदारी यांची जोपासना केली तरच आपण खरोखरच एका सशक्त, समृद्ध व न्यायपूर्ण भारताचे स्वप्न साकार करू शकू.

संदर्भसूची

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११. अशोक मेहता समिति अहवाल, १९७८



ट्रंप 2.0 : भारत - अमेरिका संबंधातील बदलांचे विश्लेषण

श्री. अभिजीत सेवागिरी गोसावी

सहाय्यक प्राध्यापक, राज्यशास्त्र विभाग,
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सारांश (Abstract)

युक्रेन-रशिया युद्ध, इराणचा अण्वस्त्र कार्यक्रम, चीनचा दक्षिण चीन व हिंद महासागरातील वाढता प्रभाव, भारत - पाक संबंधातील तणाव, इस्राएल प्रश्न या सगळ्यांच्या पार्श्वभूमीवर डोनाल्ड जे ट्रंप यांच्या दुसऱ्या कार्यकाळास (Trump 2.0) आंतरराष्ट्रीय राजकारणात विशेष महत्त्व प्राप्त झाले आहे. "अमेरिका फर्स्ट" या धोरणाचा पुनरुच्चार, वाढता राष्ट्रवाद आणि व्यवहारवादी (transactional) राजनय यांच्या पार्श्वभूमीवर भारत-अमेरिका संबंधांचे स्वरूप नव्याने घडत असल्याचे दिसून येते. या संशोधन लेखाचा उद्देश भारत-अमेरिका संबंधांचे स्वरूप समजून घेणे, ट्रंप 2.0 काळातील व्यापार विषयक धोरणांतील बदलांचा अभ्यास करणे तसेच भारताच्या धोरणात्मक स्वायत्ततेवर ट्रंप 2.0 चा परिणाम अभ्यासने हा आहे. संरक्षण, व्यापार, आणि भारताची धोरणात्मक स्वायत्तता या प्रमुख घटकांच्या आधारे हा अभ्यास करण्यात आला आहे. या संशोधनातून असे दिसून येते की, ट्रंप 2.0 प्रशासनाचे धोरण पूर्वीपेक्षा अधिक संरक्षणवादी, व्यापार केंद्री झाले आहे. तसेच ते नैतिकतेवर आधारित किंवा मूल्याधिष्ठित भागीदारीपेक्षा रणनीतिक व भुराजकीय गरजांवर आधारित व्यवहारवादी स्वरूपाचे बनलेले दिसते. सदरील शोध निबंधासाठी दुय्यम माहिती स्रोतांचा वापर करण्यात आला आहे.

संज्ञा (Keywords): ट्रंप 2.0, भुराजकीय, टॅरिफ, व्यवहारवादी राजनय, धोरणात्मक स्वायत्तता

1. प्रस्तावना (Introduction)

भारताला स्वातंत्र्य मिळाल्या पासून ते शीतयुद्ध संपेपर्यंत भारत-अमेरिका संबंध फारसे सलोख्याचे, मैत्रीचे नव्हते. मात्र शीतयुद्धाच्या समाप्तीनंतर च्या काळात भारत-अमेरिका संबंधात आमूलाग्र बदल घडून आले. विशेषतः 1991 च्या आर्थिक सुधारणा आणि 2005 च्या नागरी अणुकरारानंतर हे संबंध "रणनीतिक भागीदारी" च्या दिशेने गेले. मात्र, ट्रंप यांच्या पहिल्या कार्यकाळात या संबंधांना व्यवहारवादी आणि राष्ट्रहितकेंद्री स्वरूप प्राप्त झाले. ट्रंप यांच्या दुसऱ्या कार्यकाळात हेच स्वरूप अधिक तीव्र होत असल्याचे दिसत आहे. त्यामुळे भारत-अमेरिका संबंधांमध्ये मूलभूत बदल होत असलेले दिसून येतात.

बराक ओबामा व बायडेन प्रशासना पेक्षा ट्रंप यांच्या पहिल्या कार्यकाळात संरक्षण व रणनीतिक भागीदारीवर जास्त भर दिलेला दिसतो. चीनच्या महत्वाकांक्षेला शह देण्यासाठी अमेरिकेच्या सामरीक धोरणात भारताला प्रमुख स्थान मिळाले. व्यापार वाढीसाठी दोन्ही देशांनी प्रयत्न केले परंतु संरक्षणवादी दृष्टिकोण नव्हता. तसेच भारताच्या रणनीतिक स्वायत्तेला अमेरिकेकडून व्यापक मान्यता होती. परंतु ट्रंप यांचा दुसरा कार्यकाळ हा खूपच व्यवहारवादी आहे. 'अमेरिका फर्स्ट' धोरणामुळे मूलभूत बदल घडून आलेले दिसतात. संरक्षण संबंधामध्ये प्राथमिकता राहिली असली तरी आयात शुल्कामुळे दोन्ही देशात तणाव सद्दश स्थिति आहे.

2. संशोधनाची उद्दिष्टे (Objectives of the Study)

1. भारत-अमेरिका संबंधांचे स्वरूप समजून घेणे.
2. ट्रंप 2.0 काळातील व्यापार विषयक धोरणांतील बदलांचा अभ्यास करणे.
3. भारताच्या धोरणात्मक स्वायत्ततेवर ट्रंप 2.0 चा परिणाम अभ्यासने

3. संशोधन पद्धती (Research Methodology)

या संशोधन लेखासाठी दुय्यम स्रोतांचा वापर करण्यात आला असून त्यात सरकारी निवेदने, धोरणात्मक दस्तऐवज, दूत सोशल व एक्स वरील अधिकृत खाती, भाषणे, संशोधन लेख आणि आंतरराष्ट्रीय घडामोडींचा समावेश आहे. या शोध निबंधासाठी वर्णनात्मक व विश्लेषणात्मक अभ्यास पद्धतीचा वापर करण्यात आला आहे.

4. विश्लेषण

4.1 भारत-अमेरिका संबंध (2017-2021)

अ) धोरणात्मक आणि संरक्षण क्षेत्रातील प्रगती

या काळात भारताला 'प्रमुख संरक्षण भागीदार' म्हणून दर्जा मिळाला आणि इंडो-पॅसिफिक धोरणात एक प्राथमिक आधारस्तंभ म्हणून स्थान मिळाले. 'क्वाड' च्या माध्यमातून भारत-अमेरिका सहकार्य अधिक दृढ झाले. या संबंधांना 'सर्वसमावेशक जागतिक धोरणात्मक भागीदारी'चा दर्जा देण्यात आला. भारत-अमेरिका संरक्षण सहकार्य वाढवण्यासाठी तीन "मूलभूत संरक्षण करार केले गेले: LEMOA (2016) मुळे दोन्ही देशांच्या सैन्याला एकमेकांच्या तळांचा लॉजिस्टिक वापर करता येतो, ज्यामुळे हिंद-प्रशांत क्षेत्रातील कार्यक्षमता आणि उपस्थिती वाढली, COMCASA (2018) मुळे सुरक्षित व एन्क्रिप्टेड लष्करी संवाद शक्य झाला, ज्यामुळे संयुक्त कारवायांची अचूकता आणि समन्वय सुधारला, BECA (2020) मुळे अंतर्गत भौगोलिक माहितीची देवाणघेवाण सुरू झाली, ज्यामुळे क्षेपणास्त्र व ड्रोन प्रणालींची अचूकता वाढून भारताची सामरिक क्षमता मजबूत झाली हे करार भारत-अमेरिका धोरणात्मक भागीदारी अधिक मजबूत करण्यासाठी करण्यात आले.

ब) इंडो-पॅसिफिक आणि क्वाड : (2017-2021)

1) **इंडो-पॅसिफिक संकल्पना** — ट्रंप यांनी 2017 मध्ये 'फ्री अँड ओपेन इंडो-पॅसिफिक' धोरण मांडले. यामध्ये 'इंडो-पॅसिफिक' ही संकल्पना पुढे आली. ट्रंप प्रशासनाने यूएस पॅसिफिक कमांड चे नाव बदलून इंडो-पॅसिफिक कमांड केले, यावरून अमेरिकेच्या धोरण प्रक्रियेत भारताचे वाढते महत्त्व अधोरेखित होते. भारतासाठी इंडो-पॅसिफिक धोरणामुळे सागरी सुरक्षा, पुरवठा साखळी, तंत्रज्ञान व आरोग्य क्षेत्रात सहकार्य वाढले. यामध्ये समुद्री स्वातंत्र्य, नियमाधारित आंतरराष्ट्रीय व्यवस्था आणि चीनच्या वाढत्या प्रभावाला आळा घालणे हे प्रमुख उद्दिष्ट होते. यासोबतच भारतानेही 'सागर' धोरणाद्वारे सागरी सहकार्य आणि प्रादेशिक स्थैर्यावर भर दिला. सोबतच चीनचा हिंद महासागर, दक्षिण चायना समुद्र व पॅसिफिक महासागर या क्षेत्रातील प्रभाव कमी करण्यासाठी क्वाड (QUAD) चे पुनरुज्जीवन केले.

2) **क्वाडचे पुनरुज्जीवन (2017)** Quadrilateral Security Dialogue (Quad) मध्ये भारत, यूएसए, जपान, ऑस्ट्रेलिया हे देश सहभागी आहेत. 2007 मध्ये सुरू झालेला क्वाड 2017 मध्ये मनीला परिषदे नंतर पुन्हा सक्रिय झाला. या ग्रुपचा उद्देश मुक्त, खुला व समावेशक इंडो-पॅसिफिक प्रदेश निर्माण करणे हा आहे. अनौपचारिकपणे चीनच्या वाढत्या महत्वाकांक्षेला अटकाव करण्यासाठी क्वाड चा उदय झालेला दिसून येतो. तथापि क्वाड ही औपचारिक लष्करी आघाडी नसून रणनीतिक समन्वय मंच आहे. चीनच्या आक्रमक सागरी धोरणांच्या पार्श्वभूमीवर तो संतुलनकारी भूमिका बजावतो. 2017-2021 हा कालावधी इंडो-पॅसिफिक आणि क्वाडसाठी निर्णायक ठरला. या काळात क्वाडचा दर्जा केवळ चर्चेच्या मंचापासून राष्ट्रप्रमुखांच्या सहकार्यापर्यंत उंचावला गेला, ज्यामुळे प्रादेशिक राजकारणात भारताची भूमिका अधिक प्रभावी झाली.

4.2 ट्रंप 2.0 आणि भारत-अमेरिका संबंध

निवडणूक मोहिमेपासून सातत्याने ट्रंप यांनी "अमेरिका फर्स्ट" धोरणाचा पुनरुच्चार केलेला दिसून येतो. व्यक्तिगत पातळीवरील राजनय, बहुपक्षीय संस्थांपेक्षा द्विपक्षीय करारांना प्राधान्य, टॅरिफ युद्ध, संरक्षण खर्चात वाढ आणि चीनला रोखण्यावर भर ही या धोरणाची वैशिष्ट्ये आहेत. भारत-अमेरिका संरक्षण सहकार्य हे ट्रंप यांच्या दुसऱ्या कार्यकाळातील सर्वात स्थिर अंग मानले जाते.

शुल्क युद्ध: पहिल्या कार्यकाळात ट्रंप यांनी भारताला 'टॅरिफ किंग' असे संबोधले आणि २०१९ मध्ये भारताचा GSP (जनरलाइज्ड सिस्टीम ऑफ प्रेफरन्सेस) व्यापारी दर्जा रद्द केला, ज्यामुळे भारताने प्रतिशोधात्मक शुल्क लावले. ऑगस्ट २०२५ मध्ये, ट्रंप प्रशासनाने बहुतेक भारतीय मालावर एकत्रित ५०% शुल्क लादले (२५% मूळ शुल्क अधिक रशियन खनिज तेलाच्या सततच्या आयातीमुळे २५% दंड). ट्रंप यांनी एप्रिल २०२५ पासून आणखी प्रतिशोधात्मक शुल्काची धमकी दिली होती. त्याच वेळी अमेरिका-पाकिस्तान संबंधांमधील वाढती जवळीक आणि 'ऑपरेशन सिंदूर' दरम्यान मध्यस्थी करण्याच्या ट्रंप यांच्या वारंवारच्या दाव्यांमुळे दोन्ही देशातील तणाव कमालीचा वाढला.

परंतु 3 फेब्रुवारी 2026 रोजी अमेरिकन राष्ट्राध्यक्षांनी घोषित केले की भारतातून आयात होणाऱ्या सर्व वस्तूंवरील आयात शुल्क हे 50 टक्क्यांपेवजी 18 टक्के असेल व त्याची अंमलबजावणी तत्काळ प्रभावाने लागू केली जाईल. सोबतच भारत-अमेरिका यांच्यातील बहुप्रतीक्षित व्यापार करारावर ही शिक्कामोर्तब झाल्याचे ट्रंप प्रशासनाने स्पष्ट केले.

अ) भारत-अमेरिका व्यापार करारावर प्रभाव टाकणारे घटक :

1. निर्यात व आयातीमधील अभूतपूर्व चढ-उतार-

अमेरिका भारताचा सर्वात मोठा व्यापार भागीदार आहे. परंतु ऑगस्ट 2025 मध्ये अमेरिकेने भारतावर लादलेल्या आयात शुल्काचा सर्वाधिक फटका हा भारतातील कामगार प्रधान क्षेत्रांना बसला. त्यामध्ये प्रामुख्याने वस्त्रनिर्मिती उद्योग, लेदर (पादत्राणे), क्रीडा साहित्य उद्योग. याउलट आयात शुल्का च्या कक्षेबाहेर असलेल्या इलेक्ट्रॉनिक्स वस्तूंच्या निर्यातीमुळे नोव्हेंबर 2025 मध्ये भारताची निर्यात 22 टक्क्यांनी वाढल्याचे अकडेवारितून दिसते. भारत रशियाकडून खनिज तेल खरेदी करत असल्याने अतिरिक्त 25 टक्के आयात शुल्क लादल्याने दोन्ही देशा मधील संबंध कमालीचे तणावपूर्ण झाले होते.

2. भारत-अमेरिका व्यापार तुटीतील लक्षणीय घट-

एलपीजी सुधारनेनंतर बऱ्याचदा 'व्यापार तोल' भारतासाठी अनुकूल तर अमेरिकेसाठी प्रतिकूल राहीला आहे. भारताच्या वाणिज्य आणि उद्योग मंत्रालयाने जारी केलेल्या आकडेवारीनुसार असे दिसून येते की, भारताचा अमेरिकेबरोबरच्या वस्तु व्यापारातील नफा खूप कमी झाला आहे. एप्रिल 2025 मध्ये 3.17 अब्ज डॉलर्स असलेला हा नफा नोव्हेंबर 2025 मध्ये निम्नाने घटून 1.73 अब्ज डॉलरपर्यंत आला आहे. 27 ऑगस्ट 2025 पासून अमेरिकन प्रशासनाने भारतीय वस्तूंवर 50 टक्के आयात शुल्क लादल्यामुळे भारताची अमेरिकेला होणारी निर्यात काहीशी कमी झाली, तर दुसऱ्या बाजूला भारताने अमेरिकेकडून आयात वाढवली. दरम्यानच्या काळात भारताची निर्यात 6.86 अब्ज डॉलरवरून 6.30 डॉलरने घटली. उलटपक्षी भारताची अमेरिकेकडून आयात 3.60 अब्ज डॉलरवरून 4.84 अब्ज डॉलर एवढी लक्षणीय वाढ झाली.

3. भारत-अमेरिका एलपीजी करार-

2024 साली भारतीय तेल कंपन्यांनी अमेरिकेसोबत एलपीजी आयातीसाठी एक वर्षाचा करार केला होता. सध्या भारताची अमेरिकेकडून होणारी खनिज तेलाची आयात जवळजवळ 10 टक्क्यांपर्यंत पोहोचली आहे. भारताकडून दरवर्षी सुमारे 22 लाख टन एलपीजी आयात केली जात आहे. एलपीजी च्या बाबतीत 60 टक्क्यांहून अधिक गरज एकट्या अमेरिकेकडून आयतीद्वारे पूर्ण होत आहे. नैसर्गिक वायू हा उद्योगासाठी व घरगुती इंधनासाठी खूप महत्वाच साधन आहे. एकूण पाहता भारताने अरब देशांवरील आपले अवलंबित्व कमी करून अमेरिकेकडून आयात वाढवली आहे.

4. भारताने अमेरिकेतून खनिज तेलाची आयात वाढवली-

अमेरिकेच्या टॅरिफ धोरणाचा परिणाम जगभरातील अनेक अर्थव्यवस्थांवर झाला. त्यापैकी भारत हा सर्वाधिक प्रभावित ठरला, कारण याच कालावधीत अमेरिकेने चीनसारख्या देशांना शुल्कात मोठी सवलत दिली. दरम्यानच्या काळात भारताने अमेरिकेकडून खनिज तेलाची आयात सातत्याने वाढवली. मागील काही वर्षांपासून अमेरिका भारतासाठी खनिज तेलाचा पाचवा सर्वात मोठा पुरवठादार ठरला आहे. रशियन तेल कंपन्या लुकोईल व रोसनेफ्ट यांच्यावर अमेरिकेने लादलेल्या आर्थिक निर्बंधामुळे भारतात होणाऱ्या आयातीवर मर्यादा आल्या. एप्रिल ते ऑक्टोबर 2024 या कालावधीत भारताच्या एकूण तेल आयातीत अमेरिकेचा वाटा 4.43 टक्के होता तो एप्रिल ते ऑक्टोबर 2025 या कालावधीत 7.48 टक्क्यांपर्यंत वाढला. याच्या उलट रशियाकडून होणारी आयात 37.88 टक्क्यांवरून 32.18 टक्क्यांपर्यंत कमी झाल्याचे दिसून येते.

4.3 भारताची धोरणात्मक स्वायत्तता आणि अमेरिका

धोरणात्मक स्वायत्तता म्हणजे एखाद्या देशाने कोणत्याही महासत्तेच्या पूर्ण प्रभावाखाली न जाता आपल्या राष्ट्रीय हितांनुसार स्वतंत्र निर्णय घेण्याची क्षमता धोरणात्मक स्वायत्तता ही संकल्पना नेहरूंच्या अलिप्ततावादापासून शीतयुद्धोत्तर काळातील बहुपक्षीयतेपर्यंत आणि 21 व्या शतकातील 'रणनीतिक भागीदारी' पर्यंत विकसित झाली असून, ती भारताच्या स्वतंत्र निर्णयक्षमतेचा मूलाधार मानली जाते. म्हणजेच भारत सर्वांशी संबंध ठेवतो, परंतु कोणाचाही दुय्यम सहयोगी होत नाही.

भारत व अमेरिका या दोन्ही देशात LEMOA, COMCASA, BECA हे संरक्षण व सुरक्षा सहकार्य करार झाले. यामुळे विशेषतः इंडो-पॅसिफिक क्षेत्रात संरक्षण सहकार्य वाढले. भारताच्या क्वाड मधील सहभागाने भारत-जपान-ऑस्ट्रेलिया-अमेरिका सहकार्य वाढले. परंतु भारताने नाटो सदस्य औपचारिक लष्करी आघाडी टाळली. अमेरिकेने रशिया, इराण सारख्या देशांवर आर्थिक निर्बंध लादल्याने भारताला इराण कडून खनिज तेल व रशियाकडून एस-400 खरेदीवर अमेरिकेच्या निर्बंधाचा प्रश्न उद्भवला होता. या प्रसंगी भारताने राष्ट्रहित व राष्ट्राच्या सुरक्षेला प्राधान्य देत निर्णय घेतला याचा फायदा भारताला 'ऑपरेशन सिंदूर' मध्ये झाला. रशिया, इराण आणि इतर जागतिक शक्तींशी संबंध कायम ठेवणे हे भारताच्या बहुपदरी परराष्ट्र धोरणाचे उदाहरण आहे.

भारताने संतुलन रणनीती अवलंबून धोरणात्मक स्वायत्तता जपली आहे. अमेरिकेचा विरोध असून देखील भारताने इराण, रशिया सारख्या देशांशी ऊर्जा, संरक्षण सारखे करार केले आहेत. अमेरिका, रशिया, फ्रांस, इस्राएल सारख्या राष्ट्रा सोबत संरक्षण करार करून संरक्षण सहकार्यात विविधता आणली असून कोणत्याही एका देशावर अवलंबित्व नाही. यासोबत 'आत्मनिर्भर भारत' अंतर्गत स्वदेशी संरक्षण उत्पादन वाढवले आहे.

भारत आणि अमेरिका यांचे संबंध आज रणनीतिकदृष्ट्या अत्यंत महत्त्वाचे आहेत; परंतु भारत आपली धोरणात्मक स्वायत्तता जपण्याचा सातत्याने प्रयत्न करतो. सहकार्य वाढवताना स्वतंत्र निर्णयक्षमता राखणे—हेच भारताच्या समकालीन परराष्ट्र धोरणाचे वैशिष्ट्य आहे.

एकत्रितपणे, ट्रंप 2.0 भारताची धोरणात्मक स्वायत्तता नष्ट करत नाही; परंतु त्याचे सातत्याने परीक्षण होते. परिणामी भारताचे धोरण कोणत्याही एका गटा मध्ये संपूर्णपणे सहभागी न होता मर्यादित संलग्नतेच्या मॉडेलवर आधारित राहते, जे भारताच्या समकालीन परराष्ट्र धोरणाचे सैद्धांतिक अधिष्ठान दर्शवते.

5. निष्कर्ष (Conclusion)

ट्रंप 2.0 काळातील भारत—अमेरिका संबंध हे सातत्य आणि बदल यांचे मिश्र स्वरूप दर्शवतात. संरक्षण व रणनीतिक सहकार्य मजबूत असले तरी व्यापार क्षेत्रात तणाव कायम आहेत. ट्रंप 2.0 प्रशासनाचे धोरण हे पूर्वीपेक्षा अधिक व्यापार केंद्री, संरक्षणवादी आणि व्यवहारवादी झाले आहे. यामुळे भारताला आपली सामरिक अथवा रणनीतिक स्वायत्तता जपण्यासाठी अधिक संतुलनाच्या धोरणांची गरज आहे.

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NEP 2020 And The Vision of Viksit Bharat: A Qualitative Analysis

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Abstract

NEP 2020 is crucial for Viksit Bharat as it aims to transform India's education system. India's goal to become a developed nation by 2047. By analysing policy documents, expert opinions, and state-level implementations, this paper explores how NEP 2020's focus on holistic education, skill development, digital learning, and inclusivity drives socio-economic transformation. The study highlights NEP 2020's potential to bridge skill gaps, promote equitable education, and foster critical thinking. Key findings include the need for robust teacher training, technology integration, and stakeholder engagement to overcome implementation hurdles.

Keywords: NEP 2020, Viksit Bharat, Higher Education

Introduction:

NEP 2020 was launched on July 29, 2020, by the Union Cabinet of India. It aims to improve India's education system. The government is working on implementing it with a focus on student-centered learning, digital education, and collaboration between industries and institutions. Various bodies like the Ministry of Education and state governments are involved in its rollout. This education policy focuses on holistic education, emphasizing critical thinking, creativity, and problem-solving skills. By encouraging a multidisciplinary approach and flexibility, the policy seeks to make India a global knowledge hub and drive socio-economic growth by 2047. The National Education Policy 2020 (NEP 2020) marks a paradigm shift in India's approach to education, aiming to transform the country's human capital and socio-economic landscape. As India aspires to become a developed nation by 2047, as envisioned in the Viksit Bharat initiative, the role of education in driving this transformation becomes paramount. Viksit Bharat 2047 envisions a prosperous, equitable, and sustainable India, and NEP 2020 is a crucial enabler of this vision. By renovating the existing education system, NEP 2020 seeks to create a future-ready workforce, foster innovation, and bridge socio-economic disparities. The policy's focus on holistic education, skill development, digital learning, and inclusivity aligns with the aspirations of Viksit Bharat. This study examines the synergies between NEP 2020 and Viksit Bharat, analysing how the policy's implementation can accelerate India's journey towards becoming a developed nation. Through a qualitative analysis of policy documents, expert opinions, and case studies, this research explores the opportunities and challenges in utilising NEP 2020 to achieve Viksit Bharat's objectives, providing insights for policymakers, educators, and stakeholders to harness the policy's potential.

Review of The Literature:

- Osceen Mishra (6 June 2024) 'Navigating Change: NEP's Role in Transforming Higher Education in India' The transformative role of the National Education Policy (NEP) in reshaping higher education within India is explored in this paper. Through a critical analysis of policy objectives, implementation challenges, and anticipated outcomes, a study is conducted to highlight how the NEP seeks to address longstanding structural deficiencies. The features, opportunities, and challenges faced are examined with using secondary data.
- Mohammad Saif (23 Dec. 2021) in his mini project report entitled 'A Study on Issues and Challenges of NEP 2020 in Higher Education' explored the strengths, weakness, opportunities and challenges of NEP 2020. The issues like lack of integration, linguistic barrier, multilingual debate, pedagogical

constraints and intuitional constraints were highlighted in this study. This study is based on a primary data and secondary data.

- Latika Tamrakar, Samiksha Tamrakar, Varsha Thakur (July 2024) in their research paper 'Multidisciplinary Education: New Paradigms under NEP 2020' the new paradigms introduced under NEP 2020 are examined in this paper, with the benefits, challenges, and implications of embracing a multidisciplinary approach in higher education being explored. The policy's objectives, the integration of diverse fields of study, and the importance of flexibility in curriculum design are analysed. Additionally, the potential impact of these changes on students, educators, and the broader educational ecosystem in India is discussed.

Objectives:

- 1) To understand the role of NEP 2020 in bridging India's skill gap and enhancing employability.
- 2) To explore how NEP 2020's key pillars contribute to achieve Viksit Bharat's objectives.

Methodology: This study employs a qualitative secondary data analysis to explore how the NEP 2020 contribute to achieve the vision of Viksit Bharat.

Data Sources: Secondary Data: Includes existing relevant literature, Academic Journals, Research Articles, Reports and Publications from vivid Organisations.

Analysis:

NEP 2020: Bridging India's Skill Gap

The National Education Policy 2020 (NEP 2020) plays a pivotal role in bridging India's skill gap and enhancing employability by introducing a range of initiatives that focus on skill development, vocational training, and industry integration. One of the key aspects of NEP 2020 is its emphasis on multidisciplinary education, which enables students to pursue multiple disciplines and develop a range of skills. The policy also promotes vocational education, with a target of 50% of learners in vocational education by 2025. This is expected to equip students with industry-relevant skills, making them more employable. Additionally, NEP 2020 encourages internships, apprenticeships, and industry-academia collaborations, providing students with hands-on experience and exposure to real-world challenges. The policy also focuses on developing critical skills such as critical thinking, problem-solving, and communication, which are highly valued by employers. Furthermore, NEP 2020 promotes the use of technology and digital platforms to enhance skill development, making it more accessible and flexible. By addressing the skill gap and enhancing employability, NEP 2020 aims to contribute to India's economic growth and development, aligning with the vision of Viksit Bharat. The policy's focus on skill development is expected to benefit a large number of students, particularly those from marginalized communities, and help reduce unemployment and underemployment in India. Overall, NEP 2020's initiatives are designed to create a more skilled and employable workforce, driving India's growth and competitiveness in the global economy.

The Key Pillars Of 'NEP 2020'

- **Holistic Education:** Fosters critical thinking, creativity, and problem-solving skills, preparing students for a rapidly changing world.
- **Skill Development:** Promotes vocational training, internships, and industry integration, enhancing employability and entrepreneurship.
- **Digital Learning:** Expands access to quality education through technology, bridging geographical and socio-economic gaps.
- **Inclusive Education:** Prioritizes marginalized communities, girls, and differently-abled students, ensuring equitable access to education.
- **Multidisciplinary Approach:** Encourages flexibility and interdisciplinary learning, promoting innovation and creativity.

- **Research and Innovation:** Emphasizes research and development, promoting India's global competitiveness.
- **Global Citizenship:** Instils values of empathy, tolerance, and global understanding, preparing students for an interconnected world.

These pillars align with Viksit Bharat's goals of human capital development, inclusive growth, and global competitiveness, driving India's development by 2047.

Findings:

1. **Alignment with Viksit Bharat:** NEP 2020's emphasis on holistic education, skill development, and digital learning aligns with Viksit Bharat's goals of human capital development, inclusive growth, and global competitiveness. This alignment can drive India's development by 2047.
2. **Holistic Development:** NEP 2020's focus on critical thinking, creativity, and problem-solving skills can enhance employability and entrepreneurship. The policy's multidisciplinary approach and vocational training can equip students with industry-relevant skills.
3. **Inclusive Growth:** NEP 2020 prioritizes marginalized communities, girls, and differently-abled students, aiming to reduce socio-economic disparities. Initiatives like online education and scholarships can increase access to quality education.
4. **Digital Divide:** Effective implementation of digital learning initiatives can bridge geographical gaps, expanding access to quality education. However, addressing infrastructure and connectivity challenges is crucial to ensure equitable access.
5. **Implementation Challenges:** Successful execution of NEP 2020 requires coordinated efforts from stakeholders, including policymakers, educators, and industry partners. Addressing challenges like teacher training, infrastructure development, and resource allocation is essential to leverage NEP 2020's potential.

Conclusion:

In conclusion NEP 2020 has the potential to significantly contribute to Viksit Bharat's vision by enhancing employability, promoting inclusive growth, and driving India's global competitiveness. Effective implementation and addressing challenges will be crucial to leveraging its benefits, requiring coordinated efforts from policymakers, educators, and industry partners to realize the transformative impact on India's education system and overall development.

Limitations:

- This study is limited as it has limited depth and context of existing data
- The study has restricted ability to generalize findings to specific contexts.

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