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Two Day National Seminar on

Impact of Government Efforts to Enhance Digital Financial Literacy and Promote Digital  
Payment System in Rural India

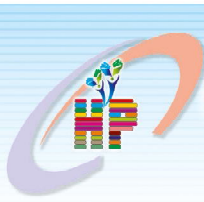
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### Principal's Message .....

It gives me great pleasure to discuss and share my views with you on the occasion of an National Conference organized by our college in collaboration with Maharashtra State Secondary Teacher Educators Association( MSSTEA), Shivaji University, Kolhapur and Maharashtra Rajya Marathi Vishwakosh Nirmiti Mandal , Mumbai on the theme ' **Challenges in implementing Integrated Teacher Education Programme ( ITEP)in TEI's and HEI's with reference to NEP-2020**

Our college is one of the reputed teacher education institution in Maharashtra run by Rayat Shikshan Sanstha, Satara founded by Great visionary and Social reformer Padmabhushan Dr.Karmaveer Bhaurao Patil in 1919. He devoted all his life for education of poor ,downtrodden and deprived class people . We have celebrated centenary year of Rayat Shikshan Sanstha in 2019, which is proud moment for all of us .

Our Sanstha has more than 650 secondary schools, Ashramshala's and hostels, 43 higher education institutions , 2 B.Ed colleges , 7 D.Ed colleges ,1 Research Institute, hostels and other branches having more than 427000 students and more than 11870 employees contributing in Maharashtra and Karnataka states.

Our college was established in 1955 by our founder Padmabhushan Dr.Karmaveer Bhaurao Patil for preparing skillful, research oriented ,socially committed teachers competent to work at rural areas . We have trained thousands of skillful and socially committed teachers working all over Maharashtra as teachers and officers on eminent posts since last 70 years . We are committed to quality education . Our mother institution always supported us for various academic and research. Our college has accredited by NAAC with A Grade in 2024 and our college is only one college of Education in Shivaji University area that has achieved 'A'Grade by NAAC in Third cycle..

I am very thankful to Hon.Chairman ,Vice Chairman , Secretary , Joint Secretary of Rayat Shikshan Sanstha , Satara , College Development Committee members and Internal Quality Assurance Cell Members for their strong support.

**Dr.Vandana S Nalawade**  
Principal,  
Azad College of Education, Satara

## Editorial.....

It is matter of immense pleasure and opportunity for us to publish the research papers presented during the two day National conference organised by our college in collaboration with Maharashtra State Secondary Teacher Educators Association( MSSTE), Shivaji University, Kolhapur and Maharashtra Rajya Marathi Vishwakosh Nirmiti Mandal, Mumbai on the theme **‘Challenges in implementing Integrated Teacher Education Programme (ITEP) in TEI’s and HEI’s with reference to NEP-2020 on 11 and 12 January 2025.**

The higher education system in India has grown in a significant way. As per the implementation NEP 2020 there are so many challenges before higher education institutions. To make available the platform for the discussion and remedies on the challenges faced by Teacher education institutions while implementing Integrated Teacher Education Programme (ITEP) is the main focus of this conference.

It is the great pleasure that we got overwhelming response to the call for papers and received 98 papers from the various Universities and parts of the country. These papers covered sub themes of the conference in English, Marathi, Hindi languages. We appreciate their valuable and intellectual support. We congratulate all Professors, teachers, researchers, and students and also sincerely thanks them for sending their research papers.

We are thankful to all Resource Persons, Academicians, Deligates and Research Scholars for their contribution in the success of Conference.

We are grateful to Hon.Sharadchandraji Pawar, President, Rayat Shikshan Sanstha, Satara, Hon, Chairman, Vice Chairman, Secretary and Joint Secretary of Rayat Shikshan Sanstha, Satara. We are very thankful to CDC Members and Hon.Prin.Dr.Vandana Nalawade for the constant support for conference. We sincerely appreciate to teaching and non teaching staff, allumni, students and all well wishers for their support and cooperation.

**Prof.Dr.N.D.Dhanwade**  
**Prof.Dr.K.R.More**  
**Prof.Dr.A.B.Patil**

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01

## AN IMPACT OF TECH INNOVATION AND DIGITAL INFRASTRUCTURE FOR FINANCIAL INCLUSION

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### ABSTRACT

Financial Inclusion has emerged as a disruptive force in the financial industry, revolutionizing how financial services are accessed and delivered. This research aims to explore the impact of Fintech on financial inclusion, focusing on the opportunities, its challenges, and the future perspectives of its integration. Financial inclusion refers to the accessibility and availability of financial services to individuals and businesses, particularly those historically underserved or excluded from the traditional banking system. On the other hand, Fintech encompasses the use of technology to provide innovative financial solutions and services. By analyzing existing literature, case studies, and empirical evidence, this research provides valuable insights into the potential of Fintech to enhance financial inclusion, bridge the digital divide, and foster economic empowerment for underserved populations. It also examines the key challenges associated with Fintech adoption and proposes recommendations for policymakers and industry stakeholders to leverage the full potential of Fintech in promoting inclusive financial ecosystems.

**Keywords:** Financial inclusion, technology, challenges, opportunities.

### INTRODUCTION

Access to financial services is crucial in promoting economic growth, reducing poverty, and fostering social development (Meola, 2017). However, a significant portion of the global population remains underserved by traditional banking systems, limiting their opportunities for financial inclusion. Financial technology (Fintech) has emerged as a disruptive force in recent years, transforming the financial services landscape and offering new avenues for expanding access to financial products and services (FinTech, 2017). Financial inclusion encompasses the availability of financial services and their accessibility and affordability to individuals and businesses. With its innovative use of technology and data, Fintech has the potential to revolutionize financial services, enabling new delivery channels, enhancing efficiency, and lowering costs (Chen, 2016). By leveraging digital platforms, mobile devices, and advanced analytics, Fintech solutions can address the limitations of traditional banking systems and extend financial services to previously excluded individuals and businesses. The term “fintech,” which stands for “financial technology,” describes the use of technology to provide cutting-edge financial goods and services.

Due to improvements in digital Infrastructure, high mobile phone penetration, and changing customer expectations for easy and accessible financial services, the fintech industry has seen tremendous expansion globally. The purpose of this research is to explore the impact of Fintech on financial inclusion, examining the opportunities it presents, its challenges, and the future perspectives of its integration by analyzing existing literature, case studies, and empirical evidence, we aim to provide valuable insights into Fintech’s potential to bridge the financial inclusion gap, particularly for underserved populations (Gogia & Chakraborty, 2022).

### FINTECH’S CURRENT STATE OF AFFAIRS

**Digital payments:**

There has been a considerable increase in digital payment options. Digital wallets and mobile payment services like Jazz Cash and Easy paisa have grown in popularity (Financial Stability Board, 2017). Through these platforms, people can use their mobile phones to carry out financial operations like bill payments, money transfers, and online purchases. The government's initiatives to promote financial inclusion and the digitization of payments have further sped up the adoption of digital payments. Microfinance and digital lending:

Fintech has significantly increased access to financial services, especially for India's underbanked and unbanked populations (Financial Stability Board, 2017). Companies like FINJA and Credit Fix offer digital lending systems that make it easy and quick for people and small enterprises to get finance. These platforms simplify the loan application process and lower the obstacles to lending by utilizing technology, alternative data sources, and cutting-edge risk assessment techniques (FinTech, 2017).

#### **Remittances:**

It is one of the top beneficiaries of remittances in the world, and Fintech has made it easier and more affordable for foreign workers to send money home to their relatives in India. Roshan Digital Account and other digital remittance platforms provide easy and secure ways for India is living abroad to transfer money home, eliminating dependency on conventional remittance methods (Blakstad & Allen, 2018).

#### **Wealth Tech and Investment Platforms:**

Fintech technologies are also significantly impacting wealth management and investing. Digital investment platforms from startups like KTrade and Smartchoice. Pk offers various investment options, like mutual funds, equities, and insurance products (FinTech, 2017). These platforms seek to simplify investment processes, offer educational tools, and give people the power to choose investments wisely.

#### **Digital Banking:**

With the introduction of digital banks, Fintech has completely transformed the banking industry in India. Users can access banking services like account management, money transfers, bill payments, and cell top-ups through digital banking platforms like Telenor Microfinance Bank's "Easy paisa" service. These platforms provide an alternative to conventional brick-and-mortar banking while also meeting the rising need for digital financial services (Blakstad & Allen, 2018).

#### **Mobile wallets have become very popular in India:**

Allowing people to use their cell phones to make payments, collect paychecks, and conduct other transactions. Users can keep money digitally, send money to another person, pay utility bills, and even shop online thanks to platforms like JazzCash, run by Mobilink Microfinance Bank, and Easypaisa. The unbanked and underbanked communities have embraced mobile payments to a large extent, giving them access to financial services via their mobile devices (Zetsche, 2017).

#### **Insurance Technology (Insurtech):**

As digital solutions are offered to simplify insurance procedures, the insurance industry in India is expanding significantly (Gogia & Chakraborty, 2022). Customers may purchase insurance plans, manage claims, and access policy information online, thanks to digital insurance platforms offered by startups like TPL Insurance and Jubilee General Insurance. The goals of insurtech developments are to improve customer experience, streamline insurance offerings, and encourage financial stability.

#### **Regulatory Changes:**

India's regulatory environment has changed to encourage the development of Fintech. Regulatory sandboxes have been developed by the Securities and Exchange Commission of India (SECP) to assist fintech startups in testing innovative goods and services in a

controlled environment (Mosteanu & Faccia, 2020). These “sandboxes” promote experimentation while guaranteeing Legal Compliance. The government’s commitment to promoting the development of Fintech and supporting financial innovation in the nation is signaled by regulatory support (FinTech, 2017).

#### **Blockchain and cryptocurrencies:**

India’s fintech market has been impacted by the development of blockchain technology and cryptocurrencies. Blockchain can enable secure and effective transactions due to its decentralized and transparent nature (Blakstad & Allen, 2018). While India is still developing its cryptocurrency regulatory framework, there is raising interest in examining the advantages of blockchain technology across various industries, including financial.

#### **Financial Education and Awareness:**

Developments in Fintech have made it possible for the general public to become more financially educated and informed. Information about managing one’s finances, choosing investments, and making financial plans is available online through venues, including educational websites and mobile applications. These tools enable people to make wise financial decisions, enhance their financial security, and actively engage in the digital economy (Findex, 2017).

#### **Regulatory Setting:**

The State Bank of India (SBP), the nation’s central bank, has taken the initiative to provide a favorable setting for the development of Fintech. In order to control digital payment providers and ensure consumer safety, cybersecurity, and risk management, the SBP introduced the Electronic Money Institutions (EMI) Regulations in 2017. The regulatory framework seeks a balance between encouraging innovation and preserving the financial system’s stability and integrity (Financial Stability Board, 2017).

#### **CONCEPTUAL FRAMEWORK**

The conceptual framework of this re-

search paper provides a theoretical foundation for understanding the key concepts and relationships between financial inclusion and Fintech. It serves as a guide to exploring the impact of Fintech on financial inclusion and identifying the opportunities and challenges associated with its integration.

#### **Financial Inclusion: Definition and Importance**

Financial inclusion refers to the availability, accessibility, and usage of financial services by individuals and businesses, particularly those historically underserved or excluded from the formal banking sector. It encompasses access to various financial products and services, including savings, payments, credit, insurance, and investment opportunities. Financial inclusion is vital for economic development, poverty reduction, and reducing social inequality by enabling individuals and businesses to participate fully in the formal economy.

#### **Fintech: Definition and Scope**

Fintech is the innovative use of technology, digital platforms, and data analytics to provide financial products and services. It encompasses various technologies and applications, including mobile banking, digital payments, crowdfunding, peer-to-peer lending, robo-advisory services, blockchain, and artificial intelligence. Fintech disrupts traditional financial systems by offering more efficient, accessible, and customer-centric solutions.

#### **Linking Fintech and Financial Inclusion**

Fintech has the potential to address the barriers that limit financial inclusion, such as geographical constraints, high costs, lack of Infrastructure, and limited access to traditional banking services. By leveraging technology and data, Fintech can offer innovative solutions that are more affordable, convenient, and tailored to the needs of underserved populations. Fintech enables the delivery of financial services through alternative channels, such as mobile phones, digital platforms, and agent networks, expanding access to previously excluded indi-

viduals and businesses. It also facilitates the development of new business models, risk assessment tools, and credit scoring mechanisms that enable lending to individuals with limited credit histories. By establishing this conceptual framework, the research sets the stage for examining the impact of Fintech on financial inclusion. It highlights the potential of Fintech to overcome traditional barriers and foster inclusive financial ecosystems. The framework also emphasizes the importance of understanding the opportunities and challenges associated with the integration of Fintech in order to maximize its benefits and mitigate potential risks. This conceptual framework guides the subsequent sections of the research, which delve into Fintech's opportunities, challenges, case studies, and future perspectives in promoting financial inclusion.

## SWOT ANALYSIS

### Strengths

Fintech, short for monetary innovation, alludes to inventive advancements to upgrade and change different parts of the monetary business. Fintech has arisen as a strong power, changing how we oversee and manage monetary exchanges. Here are a few itemized qualities of

### Fintech:

#### Enhanced Efficiency:

Fintech arrangements mechanize and smooth out various monetary cycles, further developing proficiency. By utilizing advances like artificial brainpower (artificial intelligence), AI (ML), and mechanical interaction computerization (RPA), fintech organizations can mechanize undertakings that were beforehand tedious and inclined to mistakes (Meola, 2017). This proficiency empowers quicker and more precise handling of exchanges, decreasing expenses and expanding efficiency.

#### Financial Inclusion:

Fintech can overcome issues between the unbanked or underbanked populace and monetary administrations. Through versatile

banking, advanced wallets, and shared loaning stages, Fintech has made monetary administrations available to people recently prohibited from conventional financial frameworks (Zetsche, 2017). Fintech has likewise empowered microfinance drives, engaging business people and private ventures in creating economies (Gogia & Chakraborty, 2022).

#### Improved User Experience:

Fintech organizations focus on client-driven plans and convey consistent and instinctive client encounters. Versatile banking applications, online speculation stages, and advanced installment arrangements have rearranged and customized monetary associations (Ali et al., 2019). Clients can access their records, move reserves, make installments, and oversee ventures helpfully from their cell phones or PCs. This upgraded client experience has increased consumer loyalty and commitment (Financial Stability Board, 2017).

#### Greater Financial transparency:

Fintech arrangements advance straightforwardness by furnishing clients with continuous admittance to their monetary information. Through computerized banking and planning applications, people can screen their spending designs, track costs, and gain bits of knowledge about their monetary well-being (Financial Stability Board, 2017). Fintech likewise works straightforwardly in shared loaning and crowdfunding stages, where borrowers and financial backers have direct admittance to pertinent data about one another (Vijai, 2019).

#### Market Fragmentation and Competition:

Fintech has seen a fast expansion in new businesses and laid-out organizations offering different administrations, prompting market discontinuity. This packed scene can make it moving for fintech organizations to separate themselves and gain a huge portion of the overall industry. The wild contest might drive down net revenues, require critical advertising endeavors, and venture out on the lookout (Mosteanu &

Faccia, 2020). It means quite a bit to take note of that while Fintech faces these shortcomings, the business is ceaselessly developing, and endeavors are being made to address these difficulties through development, coordinated effort, and administrative turns of events.

#### **Financial Inclusion:**

Fintech can carry monetary administrations to underserved populations and unbanked people worldwide. Using portable innovation and computerized recently prohibited from customary financial frameworks (Blakstad & Allen, 2018). This presents a critical chance to advance monetary consideration stages, Fintech can offer open and reasonable monetary administrations to individuals and enable people and organizations to create economies.

#### **Emerging Markets:**

Fintech organizations have the chance to take advantage of developing business sectors with high development potential. These business sectors frequently have huge unbanked populaces and restricted admittance to monetary administrations. By acquainting inventive fintech arrangements custom fitted with the particular requirements of these business sectors, organizations can acquire an upper hand and catch a huge piece of the pie (Financial Stability Board, 2017).

#### **Open Banking and Collaboration:**

Open financial drives and guidelines have prepared for expanded cooperation between conventional monetary establishments and fintech organizations. Fintech new businesses can join forces with laid-out banks and influence their current client base and foundation, while banks can profit from the readiness and development of fintech organizations (FinTech, 2017). This joint effort opens doors for the advancement of inventive items and administrations and upgrades the general client experience.

#### **Personalized financial services:**

Fintech can offer exceptionally custom-

ized and custom-made monetary administrations in light of individual client information. By utilizing innovations, for example, artificial intelligence and AI, fintech organizations can break down huge measures of information to acquire bits of knowledge into client conduct, inclinations, and monetary requirements (Blakstad & Allen, 2018). This empowers the conveyance of customized proposals, designated offers, and modified monetary arrangements, improving consumer loyalty and reliability. Blockchain and Distributed ledger technology (DLT): Fintech can use blockchain and DLT to alter different monetary cycles, including installments, settlements, exchange money, and character confirmation. These innovations' decentralized and straightforward nature can further develop security, decrease exchange costs, and smooth out processes, setting out open doors for additional productive and secure monetary exchanges (Blakstad & Allen, 2018).

#### **Wealth Management and Robo-advisors:**

Fintech offers open doors in the abundance of the board space through robo- warning administrations. Robo-counselors use calculations and computerization to give customized speculation guidance and the portfolio of the executives at a lower cost contrasted with the customary abundance of the board administrations (Mosteanu & Faccia, 2020). This innovation-driven approach requests another age of financial backers and presents chances to extend admittance to many board administrations.

#### **CONCLUSION**

By examining Fintech's opportunities, challenges, and future perspectives in promoting financial inclusion, this research contributes to the growing body of knowledge in the field. It aims to inform policymakers, financial institutions, technology providers, and researchers about the transformative potential of Fintech and the importance of designing inclusive and sustainable financial ecosystems in the digital

age. Ultimately, the findings of this research will shed light on ways to harness Fintech innovations for the benefit of underserved populations, fostering economic growth and social development.

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02

## Financial Inclusion through Credit Delivery- A Step Towards Development

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### Abstract:

The Reserve bank is continuing the initiatives to develop financial inclusion strategy to improve credit delivery to primary, secondary and tertiary sectors of economy. Credit delivery is the key component of financial inclusion. RBI has introduced a dashboard—ANTARDRISHTI in June 2023 for strengthening the financial inclusion under three dimensions – Access, Usages and Quality. The present study aims to examine the impact of financial inclusion through credit delivery towards economy. The Secondary data is used to analyze growth and development in the various sectors of economy. **Key words:** financial inclusion, credit delivery, dimensions, growth and development, economy.

### Introduction:

Financial inclusion has an objective of extending financial services towards those people who are not in the flow of economic activities. It is the process of bringing people into financial stream to transform economy. Financial inclusion ensures the access to appropriate financial products and services needed by vulnerable groups, such as weaker sections and low-income groups, at an affordable cost, honestly and transparently, by mainstream institutional players. The main agenda is to reach to the common or poor person by rendering financial services to achieve the financial goal. The deprived person can also get the financial services through the financial inclusion programs. United Nations (2006) stated that financial in-

clusion is “a financial sector that provides ‘access’ to credit for all ‘bankable’ people and firms, to insurance for all insurable people and firms, and to savings and payments services for everyone. It expects that everyone should be a financial literate. The government has set up a committee under the guidance of C. Rangarajan in 2008 to study financial inclusion in India. His words on financial inclusion as “the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost.”

As per the record of RBI, the composite financial inclusion index (FI-Index), a comprehensive indicator of financial inclusion across the country, recorded growth of 6.6 % to 60.1 % year-on-year in March 2023. RBI has introduced a dashboard – ANTARDRISHTI in June 2023 for strengthening the financial inclusion under three dimensions – Access, Usages and Quality. The Center for Financial Literacy (CFL) were created to cover all the blocks of the country as at end of March 2024 and also conducted a quiz on financial literacy for students across the country.

On the other hand, credit delivery has made significant role in the economy in the development of financial inclusion. Lending money to the priority sectors, MSMEs etc.

#### Review of Literature:

Some of the studies have focused on credit delivery to various sectors according to their need. Banks have made a crucial role in the development of economy as financial inclusion.

**N.A. Mujumdar (1998)** in his article entitled “credit support to priority sector : A Macro Perspective” studied the trend of credit by commercial banks to priority sector they further pointed out that the small scale industry sector which contribute more than 40 percent of the value added in manufacturing sector.

**Jyoti Gupta and Suman Jain (2012)** in their research paper entitled “A study on co-operative banks in India with special reference to lending practice” observed the customer satisfaction as well as efficiency of co-operative banking in respect of lending practice. They stated that the role of co-operative bank in promoting tiny

and rural industry is very significant than public sector banks. The role of co-operative bank in development of S.S.I. and Tiny Industry is also very crucial.

**Rakesh Mohan (2004)** in his comprehensive research article on “Finance for Industrial Growth” started from the beginning of industrialization in India. He also presented changing pattern of industrial finance over a period of time. He concluded that the Indian financial system, needs to look at new ways of doing business, in terms of Knowledge – based banking and better management of information. It is necessary to tailor the new institutional funds to long term investments.

**Robert cull and et.al. (2005)** in their research paper entitled “Historical Financing of small and medium size Enterprises “ observed historical background of small and medium size firms Industrial finance. The main purpose of this paper was to explore the role that access to finance played in generating this distribution of firm sizes – that is, the role it played in enabling firms to form at scales that were efficient for their industries and market segments and in enabling them to grow and take advantage of new technological developments and of increases in the size and scope of markets.

Apart from these many researchers have focused on the financial inclusion status with the availability of bank branches, including ATMs to cover the unbanked areas, access deposits and lending which measures financial inclusion. During the period of 1995 to 2008 financial inclusion is to be made on the Basis of data from 29 states and union territories.

#### Objective of the study

The following are the main objectives of the present paper:

1. To study overview of credit delivery system and financial inclusion in India.
2. To examine the impact of credit delivery to priority sector and MSNEs.

#### Research Methodology

The present study is analytical in nature and is based on secondary data. The required secondary data has been collected from various jour-

nals, books, Reserve Bank of India websites, etc.

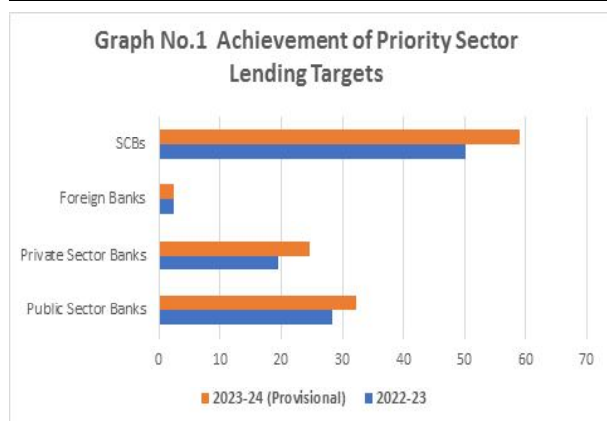
### Analysis and Interpretation:

**Table No.1 Achievement of Priority Sector Lending Targets**

(Amount in lakh crore)

| Year                  | Public Sector Banks | Private Sector Banks | Foreign Banks | SCBs           |
|-----------------------|---------------------|----------------------|---------------|----------------|
| 2022-23               | 28.4<br>(43.7)      | 19.5<br>(45.3)       | 2.3<br>(42.8) | 50.2<br>(44.2) |
| 2023-24 (Provisional) | 32.2<br>(43.4)      | 24.7<br>(48.1)       | 2.3<br>(41.5) | 59.1<br>(45.1) |

**Note:** Figures in brackets are percentage to adjusted net bank credit (ANBC) or credit equivalent of off-balance sheet exposure (CEOBE), whichever is higher.  
**Source:** Priority sector returns submitted by SCBs.



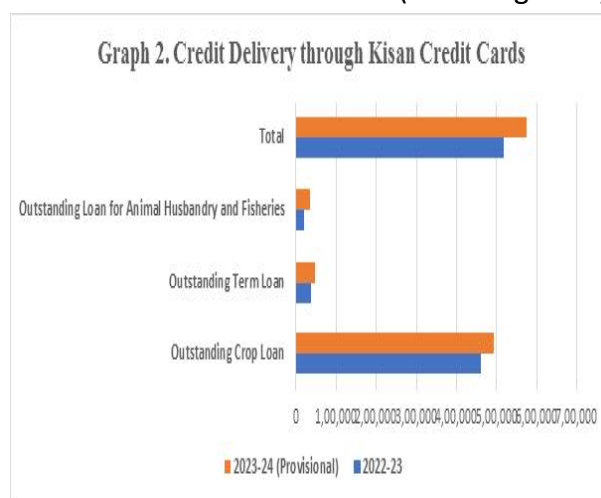
From the available information and report submitted by SCBs to RBI, it is observed that the Scheduled Commercial Banks' (SCBs') has 45.1 percent as compared to the Public Sector Banks, Private Sector Banks and Foreign Banks Priority Sector Lending (PSL) share of Adjusted Net Bank Credit (ANBC) on 31<sup>st</sup> March, 2024 All banks are shown on an average 40 per cent priority sector lending target during the year 2023-2024. It indicates the financial institutions or banks have increased the share of financial inclusion.

**Table.2: Credit Delivery through Kisan Credit Cards**

(Number in lakh, Amount in crore)

| Financial Year        | Number of Operative KCCs (excluding NPA Accounts) | Outstanding Crop Loan | Outstanding Term Loan | Outstanding Loan for Animal Husbandry and Fisheries | Total    |
|-----------------------|---------------------------------------------------|-----------------------|-----------------------|-----------------------------------------------------|----------|
| 2022-23               | 282.96                                            | 4,61,391              | 37,551                | 19,694                                              | 5,18,636 |
| 2023-24 (Provisional) | 298.14                                            | 4,93,362              | 46,332                | 35,279                                              | 5,74,973 |

**Source:** Public sector banks, private sector banks and small finance banks (excluding RRBs).



The table and graph no.2 reveals that the flow of Credit to Agriculture through Kisan Credit Card (KCC). It is a single window facility for providing working capital as well as investment credit to farmers for cultivation, animal husbandry and fisheries. The number of operative KCC cards are increased by 5.4 per cent at the end of financial year 2024 over the previous year, while the total outstanding amount increased by 10.9 per cent during the year. Credit is the key component of financial inclusion, hence KCC is one of the schemes for the development and growth of agriculture sector.

**Table 3- Bank Credit to MSMEs**

(Number in lakh, Amount in lakh crore)

| Financial Year                                 | Micro Enterprises |                    | Small Enterprises |                    | Medium Enterprises | Enterprises        | MSMEs           |                    |
|------------------------------------------------|-------------------|--------------------|-------------------|--------------------|--------------------|--------------------|-----------------|--------------------|
|                                                | No. of Accounts   | Amount Outstanding | No. of Accounts   | Amount Outstanding | No. of Accounts    | Amount Outstanding | No. of Accounts | Amount Outstanding |
| 2021-22                                        | 239.6             | 8.8                | 21.9              | 7.2                | 3.2                | 4.1                | 264.7           | 20.1               |
| 2022-23                                        | 194.4             | 10.5               | 15.7              | 7.5                | 3.2                | 4.6                | 213.3           | 22.6               |
| 2022-23(As at end-December 2022)               | 193.6             | 9.8                | 16.8              | 7.3                | 3.2                | 4.4                | 213.6           | 21.5               |
| 2023-24(Provisional) (As at end-December 2023) | 242.6             | 12.6               | 15.6              | 8.3                | 3.5                | 5.0                | 261.7           | 26.0               |

**Source:** Priority sector returns submitted by

SCBs.

Above table indicates the credit given to the MSME during the year 2022 to 2024. It is observed that the flow of credit is increasing as per the government policy. During the year 2023-24 it shows that outstanding credit is increased by 20.9 percent. As per the regulatory guidelines the lenders have to obtain 'Udyam Registration Certificate (URC)' for classification of entities as MSMEs. A special capacity building programme 'National Mission for Capacity Building of Bankers for Financing MSME Sector (NAMCABS)' has been set up since 2015 to familiarise bankers to solve credit issues of the MSME sector for the development of entrepreneurial skills amongst them. Now 3950 banks have participated during the year 2023-24.

**Table.4: Financial Inclusion Plan: A Progress Report**

| Particulars                                       | March 2010 | December 2022 | December 2023 <sup>5</sup> |
|---------------------------------------------------|------------|---------------|----------------------------|
| Banking Outlets in Villages – Branches            | 33,378     | 53,159        | 53,893                     |
| Banking Outlets in Villages > 2000* – BCs         | 8,390      | 13,83,569     | 13,15,004                  |
| Banking Outlets in Villages < 2000* – BCs         | 25,784     | 2,95,657      | 2,77,594                   |
| Total Banking Outlets in Villages – BCs           | 34,174     | 16,79,226     | 15,92,598                  |
| Banking Outlets in Villages – Other Modes         | 142        | 2,273         | 2,289                      |
| Banking Outlets in Villages – Total               | 67,694     | 17,34,658     | 16,48,780                  |
| Urban Locations Covered Through BCs               | 447        | 4,38,333      | 3,58,167                   |
| BSBDA – Through Branches (Number in lakh)         | 600        | 2,704         | 2,780                      |
| BSBDA – Through Branches (Amount in crore)        | 4,400      | 1,23,653      | 1,35,628                   |
| BSBDA – Through BCs (Number in lakh)              | 130        | 4,082         | 4,274                      |
| BSBDA – Through BCs (Amount in crore)             | 1,100      | 1,16,777      | 1,36,558                   |
| BSBDA – Total (Number in lakh)                    | 735        | 6,786         | 7,053                      |
| BSBDA – Total (Amount in crore)                   | 5,500      | 2,40,430      | 2,72,186                   |
| OD Facility Availed in BSBDA (Number in lakh)     | 2          | 89            | 53                         |
| OD Facility Availed in BSBDA (Amount in crore)    | 10         | 546           | 579                        |
| KCC – Total (Number in lakh)                      | 240        | 499           | 507                        |
| KCC – Total (Amount in crore)                     | 1,24,000   | 7,66,694      | 8,11,906                   |
| GCC – Total (Number in lakh)                      | 10         | 67            | 55                         |
| GCC – Total (Amount in crore)                     | 3,500      | 1,85,915      | 53,690                     |
| ICT-A/Cs-BC-Total Transactions (Number in lakh)*  | 270        | 25,434        | 27,294                     |
| ICT-A/Cs-BC-Total Transactions (Amount in crore)* | 700        | 8,15,598      | 9,86,236                   |

BCs: Business Correspondents. BSBDA: Basic Savings Bank Deposit Accounts. OD: Overdraft. KCC: Kisan Credit Card. GCCs: General Credit Cards. ICT: Information and Communication Technology. \$: Data are provisional. \*: Village population. #: Transactions during the financial year.

Source: FIP returns submitted by public sector banks, private sector banks and regional rural banks.

From the above table shows a progress report on financial inclusion Plan about deposits, KCC, General Credit Card and overdraft

facility during the year 2022 to 2023. Apart from this the government has introduced Financial Inclusion Dashboard – ANTARDRISHTI in June 2023 and financial literacy programme.

### Conclusion:

It is possible to expand the horizons of economy through credit delivery to priority sectors, MSMEs etc as the credit delivery is the main component of financial inclusion. The government has taken progressive steps to fulfill the target of financial inclusion successfully.

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03

## A BRIEF REVIEW OF LITERATURE ON FINANCIAL LITERACY IN INDIA

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Financial literacy plays a vital role in grow up their own level of understanding about financial factors. Financial literacy is a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual well being. Various types of peoples are excluded from financial services like small farmers, marginal farmers, and agricultural labourers, small vendors, which are engaged in unorganized sectors, landless labourers etc. Financial literacy is helpful to these peoples to use these financial services and also help in their personal financial management. The objective of financial literacy is to extend the scope of activities of the organized financial systems provided by financial institutions. The purpose of this paper is to identifying the role of banks in financial services. The objectives of this study are to take a brief review of earlier studies on financial literacy in India. This study will improve the quality of literature in the field of financial literacy. The research is also benefited to other researchers in this field. It can serve a standard for future research on financial literacy. This study takes one stapes foreword in the field of financial literacy.

**Key words:** financial literacy, financial knowledge, financial attitude and financial behaviour

**1. INTRODUCTION:**

Defining Financial Literacy "Financial literacy is a broad term that has multiple meanings, depending on an individual's situation. It may mean learning how to create and manage a household budget, learning how to invest money for retirement, or participating in one-on-one coaching and counselling to determine how to buy a house or start a business. It also is part of an overall strategy to increase economic security for lower-income families. Financial education, just like reading and writing, affects the well-being of every individual. It also affects the economic and social well-being of every community and, ultimately, the overall strength of the nation's economy." National Council of State Legislatures (NCSL) Financial literacy is the ability to comprehend how money works in the world: how someone manages to earn or make it, how that person manages it, how one invests it and how that person donates it to help others. More specifically, it refers to the set of skills and knowledge that allows an individual to make informed and effective decisions with all of their financial resources. The absence of financial literacy can lead to making poor financial decisions that can have adverse impact on the financial health of an individual. The advantage or disadvantage of variable or fixed rates is an example of an issue that will be easier to understand if an individual is financially literate. "Financial literacy is defined as measuring how well an individual can understand and use personal finance-related information" (Huston, 2010a).

"Financial literacy is an individual's ability to obtain, understand and evaluate the relevant information necessary to make decisions with an awareness of the likely consequences" (Mason & Wilson, 2000)

This paper reviews, compares and analyses studies conducted in India to determine areas of both commonality and inconsistency. As a result of this analysis, the paper presents recurrent themes that could be extended, together

with potential new areas for financial literacy research.

## 2. STATEMENT OF THE RESEARCH PROBLEM:

Rapid economic growth in India in recent years has brought in its wake a number of concerns which relate to expanding its growth across regions, sectors and people. The major objectives of economic policies are ensuring economic growth, improving economic efficiency and spreading the benefit of growth to all sections of the society. The financial sector in the country has also experienced revolutionary changes but there exist a large number of people, especially marginalised people whom the financial sector revolution has silently passed without much impact. To the people who are on the higher echelons of the society, economic and financial sector reforms have placed before them higher disposable income and a variety of financial services and products. Availability of a variety of financial products and services which are provided by a host of financial intermediaries has necessitated that the people should understand the pros and cons of each product, supplier, gains and losses liabilities etc before taking a decision. At the same time, those who are not part of the formal financial system need to be educated about the benefits of prolonged dealings with banking and other formal financial systems.

## 3. OBJECTIVES OF THE STUDY:

The main objectives of the study are as follows,

1. To study the theoretical framework of financial literacy.
2. To take a brief review of past studies on financial literacy in India.

## 4. METHODOLOGY OF THE STUDY:

### 1. Data Collection:

The present study is a descriptive study about review of past studies on financial literacy in India. The study is mainly based on secondary sources of data.

The present researcher will collect the

secondary data from RBIs web site and reports, research journals, articles, other published reports, periodicals, news papers and web sites etc.

## 5. THEORETICAL FRAMEWORK:

### 5.1 What Is Financial Literacy?

Financial literacy can be defined as the ability to understand, to evaluate, and communicate information about money and financial services. This includes the selection of appropriate financial options, the ability to plan for the future, and the capability to respond to life events and their effect on personal finances. Wisconsin's Model Academic Standards for Personal Financial Literacy is divided into seven broad categories: Relating Income and Education; Money Management; Credit and Debt Management; Planning, Saving and Investing; Becoming a Critical Consumer; Community and Financial Responsibility; and Risk Management. Each of these seven categories is an important component to the whole of financial literacy. Because of this broad range of concepts, there is more to teaching financial literacy than just having a class where students learn how to balance a check book. Topics of study would include things such as: verbal vs. written contracts, the true cost of interest, protection from loss, insurance, lifestyle choices and spending habits, bankruptcy, sources of credit, and investment options.

### 5.2 Why to Teach Financial Literacy?

There is growing evidence that students are leaving high school not knowing fundamental information on such topics as debt, credit, insurance, or even basic banking services. With the growing technological complexity and sophistication of the banking and investment industry, core knowledge on these topics is vital for people to be able to understand even the most basic of monetary transactions. Through newspaper accounts, a person can see that bankruptcy rates are higher than at any other time in history. Add this in to the rise of preda-

tory lending practices such as "payday" loans and pawn shops, the overall increase in consumer debt ratios, the decrease in the personal savings rate, and the inappropriate use of credit and it is clear that consumers—and students—may not be making decisions based on knowledge of the financial marketplace and its impact on their lives. Due to changes in investment and pension plans, many workers are now also responsible for managing their own retirement funds. Many businesses have changed from employer-sponsored plans (such as a traditional pension) to a more worker-oriented Individual Retirement Account. This shifts the responsibility to the individual and illustrates another need for information. If someone were to take the initiative and look on their own, however, there is such a plethora of information as to be incredibly confusing. Book after book on personal finance can give information, but much is contradictory, adding to the perplexity of the individual looking for answers and assistance. People who are secure in their finances are better able to contribute to a growing and healthy economy, making personal financial literacy a vital key to maintaining the economic strength of our country.

### 5.3 What Does Financial Literacy Include?

The knowledge and skills set forth in the Wisconsin personal financial literacy standards cross all grade levels and disciplines. A comprehensive, developmentally appropriate pre-kindergarten through grade 12 programs can promote personal financial literacy throughout numerous curricular areas. Educators from all grade levels can use the financial literacy standards to align instruction and create grade specific curricula and activities designed to install within students a desire to be financially literate. The standards are intended to help schools develop a comprehensive K-12 program that provides the knowledge and skills to establish sound financial habits. The standards address credit, debt and money management, planning,

saving and investing, and community and financial responsibility. They relate income and education, address being a critical consumer, and define responsible risk management. There is also a standard for personal financial responsibility to self, family, and community. This standard recognizes the potential impact of personal financial decisions on other people around us. The expanding global economy holds tremendous potential for generating income, profit, and personal wealth. The standard for community and financial responsibility recognizes that students need to understand their legal rights and responsibilities as global citizens in relation to how they use their earnings or accumulate wealth. By educating students to be responsible adults who make good financial decisions, we will keep our state growing and thriving.

## 6. BRIEF LITERATURE REVIEW:

**6.1. Puneet and Yajulu (2013)** have pointed out the financial literacy and its determinants. The study was focused on the determine level of financial literacy among salaried individuals. The researchers have also worked on the relationship between financial literacy and different demographic and socio-economic factors. To know the level of financial literacy, thirteen questions about personal finance were asked. These questions were asked to measure financial numeracy, savings and investments, borrowings, insurance, risk and return. The study also focuses on association between financial literacy and gender, education, income, nature of employment, place of work and geographic region. The study found that level of financial literacy is different in different age groups. Financial literacy is positively related to education and income level. The employees working in urban areas and non-government jobs are more financial literate as compared to those working in rural areas and Government jobs. The geographical region not affects the financial literacy significantly. From the study it can be concluded that overall financial literacy level among all

respondents is not good. The people of the country are still not much aware about financial literacy issue and necessary measures should be taken by the government to improve the situation.

## 6.2. Agarwalla, Barua, Jacob and Varma (2013)

have made an attempt to study the influence factors of socio demographic on different dimensions of financial literacy among the working young in urban India. The study was made on major three variables of financial literacy are financial knowledge, financial behaviour and financial attitude analyzed. The attributes actual used for data collection were gender, age, level of decision making process and budgeting of expenditure. The researcher also study on the inter linkages between financial knowledge, behaviour and attitude for that purpose they used spearman's rank correlation. At last they have make comparison of financial literacy of India versus other countries. The study explored the relationship between the financial knowledge and financial behaviour which is positive and according to this study there is negative relationship between financial attitude and financial behaviour. As a result the level of financial literacy among the working young in urban India is similar to the levels having in comparable groups in other countries.

**6.3. Importance of financial literacy in Indian context** is evident from the speech delivered by **Sri Pranabkumar Mukerjee**, Hon'ble Minister for Finance, Govt of India at the RBI-OECD Workshop on Financial Literacy, Bengaluru, on March 22-23, 2010. According to Sri Pranabkumar Mukerjee "Financial literacy and education plays a crucial role in financial inclusion. Inclusive growth and sustainable prosperity is also being increasingly recognised and acknowledged globally. Research and existing literature in financial literacy have thus typically associated with an individuals' knowledge of economics and finance with their financial decisions related to savings, spending, borrowing, retirement plan-

ning, or portfolio choice. It has been said, particularly in the context of the developed economies, that while the young do not save enough and do not fully understand the need for investments for future, many of the elderly tend to feel the pinch of poverty. Today, financial competence has become more often more complex choices and, while the policies need to enable access, the responsibility for saving and investing for the future primarily lies with the individuals. Viewed in this background, financial education and literacy assumes urgency in any given scenario. No wonder policymakers all over are increasingly taking note of this and directing their efforts to address it”

**6.4. Mathivathani and Velumani (2014)** have studied on the topic level of financial literacy among the women in rural area of Tamilnadu. The study focuses on factors influencing financial literacy of rural women; it will also study the barriers to acquire financial knowledge. After the study it is understood that the financial knowledge, financial behaviour and financial attitude are main dimensions of financial literacy of rural women's. The study also found that there are social, cultural, physical barriers, educational barriers and financial barriers to acquire financial knowledge for women. The study suggested that there is need to know the existing financial services available to rural women's. Financial literacy workshops, seminars and financial management coerce should be provided to women's in rural area. Lastly it will conclude that financial literacy of rural women is very low. If the financial literacy is developed it would help the women's for better financial decision and proper utilization of financial services and products.

**6.5. Cole et al. (2008)** measured the level and predictors of financial literacy, and its relationship to demand for financial services in India and Indonesia. They found strong relationships between financial literacy and financial behavior. Survey data from Indonesia and India dem-

onstrates that financial literacy is an important correlate of household financial behavior and household well being. Agarwal et al. (2010) evaluated financial literacy of online Indian investors of Hyderabad city. The findings suggest that participants are generally financially literate. Variations in financial literacy level were observed across demographic and socio-economic groups.

**6.6.** In recent years, there is considerable interest among scholars in examining the financial flows of the poor in India. **Ruthven, O. and Kumar, S.47 (2002)**, Institute for Development Policy and Management, University of Manchester conducted a study, 'Money Matters: Uncovering the Financial Life of the Poor in North India' about the financial behaviours of 49 carefully selected urban and rural households over a 12-month period. Half of the sample lived in Delhi slums and half in two villages in Koraon, Allahabad District, and Uttar Pradesh. Interviews occurred every fortnight so that 'financial diaries' could be constructed of all the formal and informal financial services that were used. This methodology permitted deep insights into the financial lives of these people and uncovered complex behaviours that surveys do not hear about. The study found that all households, however poor, had money which they needed to manage and actively sought out financial services to do this. The quest for service was also for future needs and the households had different goals ranging from rare survival to becoming wealthy people. They needed access to loans to overcome anticipated needs. The respondents used a wide array of devices to get credit. The average household uses eight different devices and engaged in 22 deals during the year. All the urban and 86% of rural households borrowed from friends, relatives and neighbours.

**6.7.** In the research paper 'Financial Counseling, Financial Literacy, and Household Decision Making' **Sumit Agarwal (2010)** reviews the literature on financial counselling, financial lit-

eracy, and consumer decision making and look at a financial counselling/planning program in India where consumers revealed their risk appetite, future financial goals, and current assets and liabilities. The results from India suggest that a vast majority of the respondents appear to be financially literate – they answer the numeracy, inflation, and diversification questions correctly. The Indian financial literacy level is the same as in Netherlands but 20% higher compared to the USA. Indians use about 38% of monthly income to cover monthly expenses – they save or invest 62% of their salary on average. However, most consumers are ill prepared to meet their goals based on their asset, liabilities and risk profiles. The survey of the literature 88 suggests that financial counselling is an important tool in educating consumers in their decision making.

**6.8. Sriram and Smita Parhi (2006)** Indian Institute of Management, Ahmedabad conducted a 'study on the financial status of the rural poor in Udaipur District in Rajasthan State'. The objectives of the study were to understand the financial flows of the rural poor and to have an insight into their financial status. Data was collected from 36 households classified as Below Poverty Line. The findings indicate that the overall level of indebtedness of the poor is not alarming as they have sufficient assets. The poor borrow from various sources to meet their needs. The most striking finding was that the poor resort to borrow from local money lenders even for asset purchase while they keep away their savings in earthen pots. Both these indicate the failure of the financial institutions in using a market opportunity. Most of the borrowings are from relatives and friends.

**6.9. Shachi Prakash (2012)** in the article 'Retail Banking Strategy: Criticality of Financial Literacy and Credit Counselling in Indian Context' opines that the importance of financial education and credit counselling needs no emphasis in a country like India, it is rather surprising that the ini-

tiatives of banks in this respect such as financial literacy and credit counselling centres have remained only "initiatives" even after a considerable time. He points out that it is high time banks realize the importance of financial education and credit counselling, particularly in the context of increasing defaults, financial inclusion, and sustainable and inclusive growth. What is important to be realized by banks is that they are the beneficiaries of financial education and credit counselling. It is time banks act and strengthen financial literacy and credit counselling centres.

## **7. DISCUSSION ABOUT THE REVIEWS ON FINANCIAL LITERACY RESEARCH:**

Past Studies on financial literacy focusing on financial literacy and its determinants, the influence factors of socio demographic on different dimensions of financial literacy among the working young in urban India, Financial literacy and education plays a crucial role in financial inclusion, level of financial literacy among the women in rural area of Tamilnadu, Financial Counselling, Financial Literacy, and Household Decision Making in India, Study on the financial status of the rural poor and Retail Banking Strategy: Criticality of Financial Literacy and Credit Counselling in Indian Context.

However, no any specific attempt has been made to track financial literacy, knowledge and skills in Indian senior. Furthermore, no attempt has been made to develop a model to measure financial literacy in Indian context. Several financial characteristics have been included in most studies, although little details are known about their structure and complexity and whether this contributes differently to financial literacy acquired over time. A number of studies revealed that personal financial skills and knowledge are acquired mostly through 'trial and error', hence it could be that extensive details of financial experience and characteristics influence financial literacy levels and would prove to be important covariates in modelling

financial literacy among general populations.

## 8. CONCLUSION:

After reviewing various researches and case studies related to financial literacy it was found that in India financial literacy is poor. In India there were very small efforts are taken related to financial education and it will affect the financial literacy. Although the above studies have identified segments of the population that have poor financial literacy, there are significant limitations, suggesting further areas of research. There was need of development of accurate parameters to measurement of financial literacy in Indian senior. Because financial literacy has become increasingly important for the economic wellbeing of the nation's future it is important that it can be explicitly linked with financial behaviour, and hence financial success and sustainability. No financial literacy study has yet achieved this. Lastly, further research could focus on the actual measurement of financial literacy. Extensive research and testing is needed to determine consistency and more realistic benchmarks for the ongoing measurement of financial literacy.

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04

## Comparative Study of Personal Loan in Nashik District

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### Introduction

Personal and business loans are two major financial products provided by banks and non-banking financial institutions (NBFCs). While personal loans cater to individuals for personal expenses, business loans are tailored to meet the financial needs of enterprises. This review explores the distinctions, purposes, benefits, challenges, and recent trends in personal and business loans, highlighting insights from past studies and reports. This is a general term used for loans that individuals take for their personal needs. These loans are primarily used to fulfill various life requirements such as personal expenses, emergencies, education, medical expenses, and purchasing a home or vehicle.

### OBJECTIVE OF RESEARCH PAPER:-

The primary objective of this study is to analyse the Personal Loan and customer sat-

isfaction

**RESEARCH METHODS:** This study employs both descriptive and analytical research techniques. A research plan has been developed in accordance with the research objective.

The principal sources utilised were questionnaires and interviews. Furthermore, comprehensive data has been gathered through sample questionnaires concerning customers from various banks from Nashik District, attributed to the prevalence of personal Loan.

### SAMPLE SELECTION:-

Forty samples of 208 customers from various Banks have been selected from all districts of Nashik for this research.

### DEFINITION AND PURPOSE

Personal loans are unsecured loans provided to individuals to meet personal financial requirements such as medical emergencies, weddings, vacations, or debt consolidation. Since they are unsecured, lenders rely heavily on the creditworthiness of borrowers.

Personal loans are generally used for the following purposes:

#### 1. Personal Loan Usage Categories:

**Education Loan:** For educational expenses of students.

**Vehicle Loan:** For purchasing or repairing a vehicle.

**Medical Loan:** For medical treatments, surgeries, or other related expenses.

**Home Expenses:** For purchasing, renovating, or maintaining a home.

**General Loan:** For various personal reasons (such as for vacations, weddings, etc.).

#### 2. Features of Personal Loans:

**Obtained from Banks or Financial Institutions:** Personal loans can be obtained from banks, financial institutions, or P2P (Peer-to-Peer) lending platforms.

**No Need for Collateral:** Generally, personal loans do not require any kind of collateral (referred to as bank collateral), unless they are secured loans.

**Interest Rates:** These loans are personal, so their interest rates vary between commercial banks, private banks, and non-banking financial companies.

**Loan Amount and Duration:** The loan amount and repayment period vary depending on the type of loan. Generally, the loan amount can range from 50,000 to 50 lakh, and the duration can range from 1 to 5 years.

### 3. Personal Loan Process:

**Application:** The individual applies to the bank. The application includes details about the loan amount, its usage, repayment terms, and interest rates.

**Document Verification:** The borrower's identity, income, age, credit score, and other documents are verified.

**Interest Rate Determination:** The interest rate is set based on the borrower's credit score, income, and loan amount. A good credit score results in a lower interest rate.

**Loan Approval:** Once all documents and checks are complete, the loan is approved, and the loan amount is deposited into the borrower's account by the respective bank.

**Loan Repayment Method:** The loan is repaid in the form of EMI (Equated Monthly Installments), which includes both interest and principal.

### 4. Advantages of Personal Loans:

**Quick Availability:** These loans are generally approved quickly, sometimes within 24 hours.

**Unsecured Loan:** Once the loan is sanctioned, the borrower has the freedom to use it as per their requirement.

**Simple Process:** The process of taking the loan is simple, and sometimes fewer documents are required.

**Beneficial for Personal Needs:** These loans are useful for fulfilling various personal needs (education, marriage, home loans, etc.).

### 5. Disadvantages of Personal Loans:

**High Interest Rates:** Interest rates can be higher compared to other loans, especially when the credit score is not good.

**Loan Fraud:** Sometimes, individuals may become overenthusiastic about borrowing and find themselves in difficulty when it comes to repayment.

**Missed Payment Issues:** If EMI payments are missed, additional fees and penalties may be charged.

### 6. Eligibility for Personal Loans:

**Age:** Generally, individuals aged between 21 and 65 years are eligible.

**Income:** The borrower must have a consistent income.

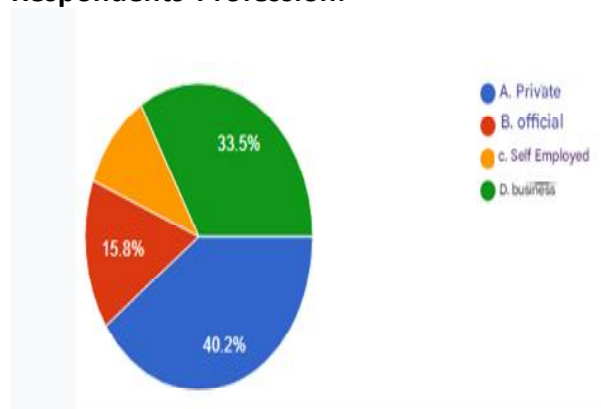
**Credit Score:** The borrower should have a good credit score, as it affects loan approval and interest rates.

**Job Stability:** The borrower must have been employed for a specific period (usually 1-2 years).

### DATA ANALYSIS AND INTERPRETATION IN QUESTIONNAIRES:-

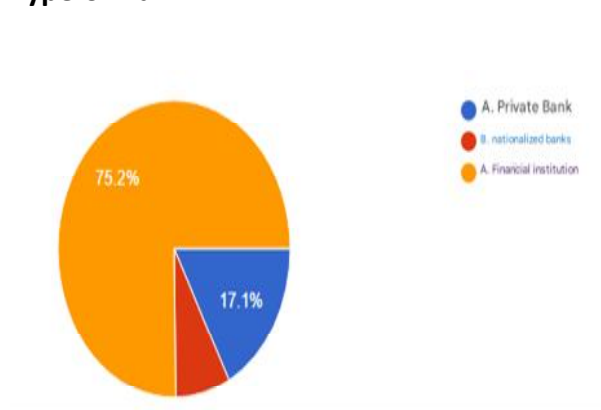
In this study we collect 208 Responses through Google form.

#### Respondents Profession:-



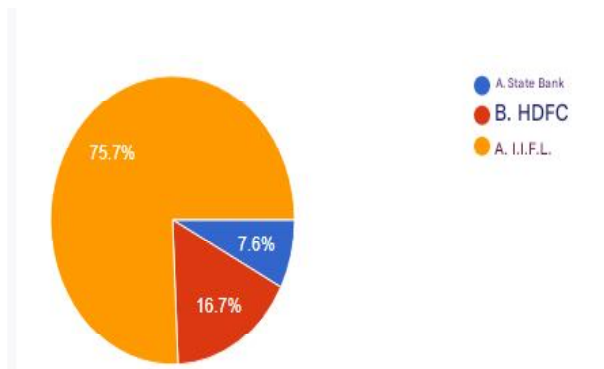
40.2% Respondents from private sector employee who take personal Loan. Only 10% self-employees take personal loan

#### Type of Bank:-



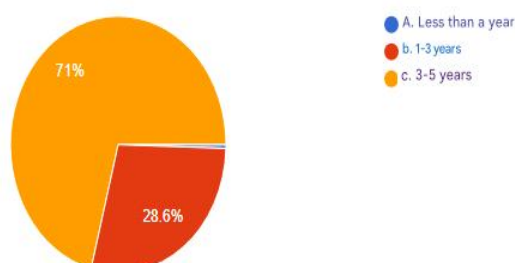
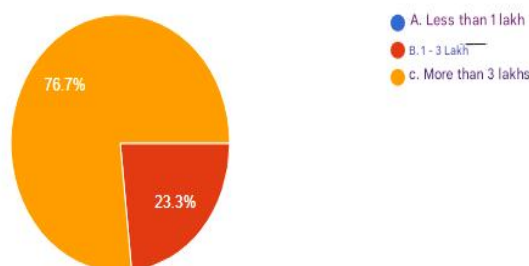
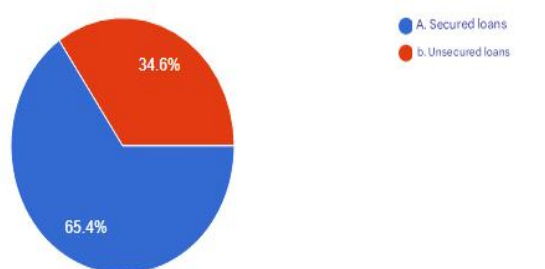
75.2% loan taken from Financial Institution

tion only 8% respondents take loan from nationalized bank. Customers go through easy and fast process of Loan.



75.7% loan taken from Financial Institution like IIFL bank. Customers go through easy and fast process of Loan.

#### Type of Loan, Period and Amount:-



65% Loan is Secured Loan and it is more than Rs 300000. Period of repayment of loan also 3 to 5 years of 71% respondents. This

shows customers satisfied with more amounts of loan and also long period.

#### Conclusion:-

Personal loans are unsecured loans provided to individuals to meet personal financial requirements such as medical emergencies, weddings, vacations, or debt consolidation. Since they are unsecured, lenders rely heavily on the creditworthiness of borrowers. customers satisfied with more amounts of loan and also long period.

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## **Rural – Urban Digital Financial Literacy Divide in India: A comparative study in Srikakulam District of Andhra Pradesh**

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### **Introduction:**

In recent era financial literacy is the most popularly used term in the financial activities. Financial literacy is the ability to understand and effectively use various financial skills including personal financial management, budgeting and investing. Financial literacy is the ability to learn, monitor and effectively use financial resources to improve the well-being and economic security of an individual. Financial literacy is a mixture of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately attain individual financial well-being. When a person is financially literate and aware they can do well management of money. The earlier you start to become financially literate, that can be beneficial because education is the key to a successful financial future. One of the major abilities required in the present scenario for an individual is to have the basic knowledge related to financial literacy and basic competencies to handle the problems related to finance.

Digital literacy is the ability to understand and effectively use digital financial tools, services and platforms. It empowers individuals to make informed financial decisions, manage risks and protect their assets in raising digital world.

In other words, digital financial literacy refers to the knowledge and skills needed to effectively use digital financial services. Digital financial literacy includes the awareness about online banking, digital payments, cyber security, payment banks, budgeting apps, fraud prevention etc. In today's digital age most of the people are using digital financial transactions. especially the covid-19 pandemic situation brought drastic change in digital payments. One of the significant moves towards digital transactions has taken place in covid19 conditions. No touch and keep safe distance during covid led to rise in digital payments. After 3 years of covid, financial transactions are increasingly conducted online through mobile banking to crypto currency investments. Hence digital financial literacy is essential for individuals to navigate the modern financial landscape securely and efficiently. The knowledge of digital financial literacy helps people to make informed about decisions, avoid scams, conduct transactions securely and manage their assets effectively.

### **2. Objectives**

To assess the current level of digital financial literacy among different urban and rural groups different demographic groups.

To analyse the importance of digital financial literacy.

To examine the challenges and barriers for digital financial services and suggest recommendations.

### **3. Key Elements of digital literacy**

#### **A. Online banking & Digital transactions**

- Understanding internet and mobile banking.
- Using ATMs, debit/credit cards, and online payments.
- Digital wallets and UPI (Unified Payments Interface).
- E-commerce transactions and online bill payments.

#### **B. Digital Budgeting & Financial Management**

- Using financial management apps (e.g., Mint, YNAB, PocketGuard).
- Tracking expenses, setting budgets, and analyzing spending habits.
- Automatic savings and investment planning.

### C. Cybersecurity & Fraud Prevention

- Recognizing phishing, identity theft, and online fraud.
- Using strong passwords and two-factor authentication (2FA).
- Safe browsing habits and securing personal financial information.
- Awareness of digital lending frauds and Ponzi schemes.

### D. Digital Investment & Cryptocurrency Awareness

- Basics of online trading and investment platforms.
- Understanding cryptocurrency, blockchain, and associated risks.
- Awareness of digital financial regulations and compliance.

## 4. Research Methodology

The study adopted a **mixed-methods approach** (quantitative and qualitative) to comprehensively analyze digital financial literacy levels, challenges, and impact in selected rural and urban areas of Srikakulam district of Andhra Pradesh.

- **Descriptive Research:** To assess the current state of digital financial literacy.
- **Exploratory Research:** To explore barriers, opportunities, and solutions in bridging the urban-rural divide.

### Primary Data Collection

Primary data was collected through Structured and semi-structured questions to collect data from urban and rural populations. Focus group discussions with urban and rural individuals to understand experiences and barriers. Assessing real-world digital financial behaviours in urban and rural settings.

**Secondary Data Collection:** it is collected from

different sources like Review of Literature from Academic journals, government reports, and fintech industry publications Analysis of financial literacy programs, digital payment adoption rates, and regulatory policies.

### Sampling Technique

- **Target Population:** Urban and rural individuals, small business owners, digital banking users, and financially underserved populations.

### Sampling Method:

**Stratified Random Sampling:** To ensure diversity across age, gender, income level, and location.

**Purposive Sampling:** For expert interviews and focus groups.

- **Sample Size:** A total of **400 respondents** (adjustable based on study scope) has taken for this study.

**Data Analysis Techniques:** To analyse the collected data statistical tools like SPSS, Excel for mean, median, mode, percentage distributions. Sampling Area:

### I. Urban Areas

Srikakulam district comprises several urban settlements, including a municipal corporation, municipalities, nagar panchayats, and census towns. Key urban areas to consider are:

- **Srikakulam:** The district headquarters and only municipal corporation, serving as the primary urban center.

### · Municipalities:

**Amadalavalasa:** A significant town with notable population and infrastructure.

**Ichchapuram:** Located near the Odisha border, it offers unique demographic insights.

**Palasa-Kasibugga:** Known for its cashew processing industry, reflecting economic diversity.

### · Nagar Panchayat:

**Rajam:** An emerging urban area with growing commercial activities.

### · Census Towns:

**Balaga:** Adjacent to Srikakulam city, providing peri-urban perspectives.

**Hiramandalam:** A smaller town offering insights

into semi-urban dynamics.

**Narasannapeta:** A notable town with a blend of urban and rural characteristics.

**Ponduru:** Famous for its fine khadi weaving, reflecting traditional industries.

**Sompeta:** A town with agricultural and commercial significance.

**Tekkali:** A key town with educational institutions and markets.

Selecting a mix of these urban areas will provide varied insights into digital financial literacy across different urban settings.

## II. Rural Areas

Srikakulam district encompasses numerous villages across its 30 mandals. To ensure a representative rural sample, consider the following approach:

- **By Mandal:** Select villages from different mandals to capture geographical diversity. For instance:

**Palasa Mandal:** Villages like Devudala and Ganguvada.

**Amadalavalasa Mandal:** Villages such as Peddapadu and Ragolu.

**Etcherla Mandal:** Villages like Laveru and Voppangi.

## Hypotheses

- **Null Hypothesis (H):** There is no significant difference between the means of the two groups.

- **Alternative Hypothesis (H):** There is a significant difference between the means.

## Limitations of the Study

- Limited digital access in rural areas may restrict survey participation.

- Self-reported data bias, where respondents may overstate or understate their digital financial literacy.

- Evolving digital financial landscape, requiring continuous updates.

## 5. Importance of Digital Financial Literacy

The significance or importance of digital financial literacy can be studied as under

**A. Increases Financial Inclusion:** Digital finance

provides access to banking services for those in remote areas or without traditional bank accounts. Online banking transactions allow users to conduct transactions without visiting a physical bank visit.

**B. Awareness:** Digital financial literacy can enhance the security in financial transactions. Since cyber crimes are on the rise, digital financial literacy helps individuals recognise and avoid fraud, phishing scams, and identity theft. In today's hacking world, there is a need for digital financial literacy to reduce or minimise the cybercrime. The rise in the number of complaints under cybercrime indicates the need for creating awareness among the digital financial users.

**C. Better financial plan & Money Management:** Managing money is the key aspect for financial growth. Digital transactions through online banking apps and budgeting apps help users to track the expenses, set saving goals, avoid unnecessary debt, make a proper plan of expenses.

**D. Easy and secured payments:** Digital payments are easy and simple to perform with basic knowledge of internet use. Use of digital platforms for financial transactions makes the transaction faster and more convenient. Knowledge of these platforms helps users to save time and avoid the unnecessary delay in it.

**E. Future growth:** Digital transactions are the future face of the world. The financial world is evolving with blockchain, cryptocurrencies and fintech innovations are shaping the future. Understanding these trends helps individuals stay ahead and make informed investment decisions.

**F. Economic Growth:** Digital transactions also help to promote economic growth in the economy through entrepreneurship and digital commerce.

**G. Greater Access:** Digital financial transactions have a greater access to financial services at anytime anywhere. Use of internet enables access to the digital platforms from anywhere any

time to do the transaction.

## 6. Data presentation

Demographic characteristics of respondents

**Table:1 Age, Gender, Education of respondents**

| Variable  | Category    | Urban (n=200) | Rural (n=200) | Total (N=400) |
|-----------|-------------|---------------|---------------|---------------|
| Gender    | Male        | 120 (60%)     | 110 (55%)     | 230 (57.5%)   |
|           | Female      | 80 (40%)      | 90 (45%)      | 170 (42.5%)   |
| Age Group | 18-30       | 100 (50%)     | 80 (40%)      | 180 (45%)     |
|           | 31-50       | 70 (35%)      | 90 (45%)      | 160 (40%)     |
|           | 51+         | 30 (15%)      | 30 (15%)      | 60 (15%)      |
| Education | High School | 50 (25%)      | 120 (60%)     | 170 (42.5%)   |
|           | College+    | 150 (75%)     | 80 (40%)      | 230 (57.5%)   |

**Table: 2. Digital financial literacy scores by location**

It compares average literacy scores between urban and rural groups

| Group | Mean Score | Standard Deviation | Min Score | Max Score |
|-------|------------|--------------------|-----------|-----------|
| Urban | 85.6       | 7.2                | 72        | 94        |
| Rural | 68.9       | 5.8                | 65        | 72        |

Source: Calculation based on field survey

**Table:3. Awareness & Usage of Digital Financial Services**

Shows how many respondents use various digital financial services.

| Service                | Urban Usage (%) | Rural Usage (%) | p-Value |
|------------------------|-----------------|-----------------|---------|
| Mobile Banking         | 90%             | 50%             | 0.001   |
| UPI (Google Pay, etc.) | 95%             | 55%             | 0.002   |
| Online Loans           | 60%             | 30%             | 0.015   |
| Cryptocurrency         | 25%             | 5%              | 0.030   |

Source: Calculation based on field survey

**Table:4. Barriers to Digital Financial Adoption**  
Summarizes the challenges faced by users.

| Barrier                | Urban (%) | Rural (%) | Overall (%) |
|------------------------|-----------|-----------|-------------|
| Lack of Internet       | 10%       | 60%       | 35%         |
| Cybersecurity Concerns | 40%       | 50%       | 45%         |
| Trust Issues           | 30%       | 55%       | 42.5%       |
| Lack of Awareness      | 25%       | 70%       | 47.5%       |

Source: Calculation based on field survey

**Table: 5. Regression Analysis: Factors Affecting Digital Financial Literacy**

Examines which factors significantly impact literacy levels.

| Independent Variable | Beta Coefficient | p-Value | Significance    |
|----------------------|------------------|---------|-----------------|
| Education Level      | +0.45            | 0.002   | Significant     |
| Internet Access      | +0.30            | 0.010   | Significant     |
| Income Level         | +0.20            | 0.050   | Significant     |
| Age                  | -0.10            | 0.250   | Not Significant |

Source: Calculation based on field survey

**Table:6. t -test results: Urban vs. Rural digital literacy score**

This table presents the t-test results to check if the literacy gap is significant.

| Variable               | t-Statistic | p-Value | Significance           |
|------------------------|-------------|---------|------------------------|
| Urban vs. Rural Scores | 6.57        | 0.00025 | Significant (p < 0.05) |

## Interpretation

Since the p-value (0.00025) is much smaller than 0.05, we reject the null hypothesis (H). This means there is a statistically significant difference between the digital financial literacy scores of the Urban and Rural groups.

This suggests that individuals in urban areas have significantly higher digital financial literacy scores compared to those in rural areas.

## 7. Major Findings of the study

- Higher digital financial awareness in urban areas compared to rural areas, with more urban respondents using mobile banking, UPI, and online transactions.

- Limited internet and smartphone access in rural areas, affecting digital financial adoption.

- Urban respondents actively use digital wallets (Google Pay, PhonePe, Paytm) for transactions, while rural respondents rely more on cash and traditional banking.

- Rural adoption of mobile banking is

growing but remains low due to lack of awareness and digital confidence.

- Government welfare schemes (PMJDY, DBT, Jan Dhan Accounts) have increased rural digital financial participation but are underutilized due to low awareness.

- Lack of awareness and digital education is the primary reason for low adoption in rural areas.

- Fear of online fraud and cybercrime discourages both urban and rural respondents from fully adopting digital finance.

- Language barriers make it difficult for rural populations to navigate English-based financial apps.

- Poor internet connectivity in remote villages restricts access to online banking and transactions.

- Men in both urban and rural areas are more digitally financially literate than women, highlighting a gender gap in digital financial inclusion.

- Younger generations (18–35 years) are more comfortable with digital finance, while older individuals (50+ years) prefer traditional banking methods.

- Existing government and bank-led awareness programs have had limited reach in rural areas.

- Rural populations still prefer cash over digital transactions, citing security concerns and lack of trust in online payments.

- Urban users trust digital transactions more but remain cautious about cyber fraud.

- Banks play a crucial role in digital literacy but lack extensive outreach programs in villages.

**8. Challenges:** despite its great advantages, digital financial literacy has many challenges to face on. Some of those are discuss below.

**Lack of awareness:** Since the literacy rate low in many states in India and thereby digital financial literacy also low. Comparatively it is very low in rural areas.

**Cybersecurity:** In today's techno world there are many risks associated with digital payments where the users are losing money every day. The most unfortunate thing is that the cybercrime history shows that even highest educated people also experienced the frauds.

**Digital Divide:** The digital divide is another big challenge in India. Since everyone does not have equal access to technology and use of internet there are digital gaps. We can observe a major digital divide in Rural and urban areas.

### 9. Recommendations for Bridging the Digital Financial Literacy Gap

- Targeted awareness campaigns in local languages to educate rural populations.

- Expansion of financial infrastructure (ATMs, digital kiosks) in villages to promote digital transactions.

- Stronger cybersecurity awareness programs to reduce fear of fraud.

- Special programs for women and elderly individuals to ensure inclusive digital financial growth

**10. Ways to improve Digital Literacy:** Here are discussed some ways to improve the digital literacy

**Educational Initiatives:** To improve the digital financial literacy can following educational initiatives through schools, banks, and government also should promote the digital education through different programs and schemes.

**Workshops/ Webinars:** Government or private organisations can conduct fruitful workshops / webinars to create awareness among users about its uses, precautions and security.

**Awareness Campaign:** in view of cybercrime severity, it is high time to create awareness among users about the risks associated with digital payments.

**Practical learning:** encourage the users to use the digital platforms under guided supervision.

### 11. Conclusion

Digital financial literacy is essential in today's digital era to ensure financial security,

independence, and empowerment. By developing a strong understanding of digital finance, individuals can maximize the benefits of digital banking, avoid financial pitfalls, and contribute to economic growth. The study shows the association between people residential location in terms of rural and urban and financial literacy. The results of this study show the need for persistent and prolonged intervention from all the stakeholders, including policy makers to educate and improve basic financial literacy for better financial decision making in rural and urban areas. Financial knowledge especially the digital financial knowledge is considered as an essential prerequisite for survival and lack of this knowledge lead to harmful consequences to the users as well as the economy.

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## Reviews and Reflections on Digital Payments System in India

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### Abstract:

The fast adoption of digital payment methods in India has radically changed the economy of the nation and pushed it in the direction of a more effective and inclusive financial system. The development, present situation, difficulties, and potential of digital payments in India are examined in this paper. It draws attention to the significant contributions made by important laws, government programs, technology advancements, and societal elements to the country's rise in digital transactions. The research examines the digital payments system and discusses the challenges of cybersecurity, financial literacy, and digital infrastructure. Lastly, the paper explores the future course of digital payment systems in India, taking into account new developments in technology and the growing popularity of cashless transactions.

**Keywords:** Digital payments, India, Financial Inclusion, Government initiatives, Technology, UPI, Cashless economy.

### Introduction

India, with its vast population and swiftly evolving digital economy, has emerged as a promising area for the growth of digital payment systems. Traditionally, cash transactions have been prevalent in the nation; however, in recent times, India has experienced a significant shift toward digital payments due to technological advancements and various policy changes pro-

moting a cashless economy. The Indian government, alongside innovations from the private sector, has propelled the development of digital payment systems, making financial services available to millions who were previously out of reach of the formal banking system.

This paper examines the key developments, challenges, and opportunities in India's digital payment landscape.

#### Objectives of the Study –

1. Examine the Evolution of Digital Payment Systems in India
2. To study the existing digital payment landscape, identifying key players, platforms, and technologies currently driving digital payments.
3. Identify the Benefits and Advantages of Digital Payment Systems.
4. Examine the Challenges and Barriers to Widespread Adoption.
5. Propose Recommendations for Enhancing the Digital Payment Ecosystem

#### Research Methodology –

##### Research Design

The researcher adopted a **descriptive** and **exploratory research design**:

- **Descriptive Research** is used to explain the current landscape of digital payment systems, such as the types of payment platforms, their adoption rates, and key technological players.
- **Exploratory Research** is employed to understand emerging trends, challenges, and future opportunities, with a focus on uncovering the reasons behind issues.

#### Sources of Data –

The present study is basically based on secondary data, the secondary data is collected from research papers, magazines, news papers and RBI reports.

#### Evolution of Digital Payment Systems in India

The journey of digital payment systems in India can be traced back to the late 20th century, when early forms of electronic transactions, such as credit and debit cards, began to make

their presence felt in urban centers. However, the real transformative phase started in the 2000s with the development of the National Payments Corporation of India (NPCI) and the implementation of core banking solutions.

#### Key milestones include:

- **The Launch of the National Payments Corporation of India (NPCI):** NPCI was established in 2008 with the aim of consolidating and transforming the payment systems in India. It was instrumental in launching initiatives such as the **Immediate Payment Service (IMPS)** and the **Unified Payments Interface (UPI)**, which significantly contributed to the growth of digital payments.

- **The Introduction of UPI (2016):** The launch of the Unified Payments Interface (UPI) by the Reserve Bank of India (RBI) and NPCI in 2016 revolutionized the digital payments ecosystem. UPI enabled instant, 24x7 interbank money transfers using mobile phones, leading to a rapid increase in transactions.

- **Demonetization (2016):** In November 2016, the Indian government demonetized high-value currency notes, creating a liquidity crisis and compelling people to embrace digital payments. This act served as a major catalyst in the adoption of cashless transactions.

- **Aadhaar Integration:** The government's biometric identification system, **Aadhaar**, became a critical infrastructure for digital payment systems. By linking bank accounts to Aadhaar, the government aimed to enhance financial inclusion and reduce fraud.

#### Present Scenario of Digital Payment Systems

India's digital payment ecosystem today is one of the largest in the world. It encompasses a wide variety of services, including mobile wallets, UPI, internet banking, point-of-sale (POS) machines, and government initiatives like Bharat Bill Payment System (BBPS) and digital currency. Key Players in the Digital Payment Ecosystem:

- **Unified Payments Interface (UPI):** UPI has emerged as the most widely used digital pay-

ment system in India. It enables instant money transfer and bill payments, and is integrated into most mobile banking applications and wallets like Paytm, Google Pay, and PhonePe.

· **Mobile Wallets and Payments Apps:** Platforms like Paytm, PhonePe, and Google Pay have capitalized on the smartphone boom, providing convenient ways for users to make peer-to-peer transactions, pay bills, and shop online. These platforms have witnessed exponential growth in recent years.

· **Aadhaar-enabled Payments:** The integration of Aadhaar into various payment systems has allowed people to access government welfare schemes, transfer money, and make payments seamlessly.

· **Point of Sale (POS) and QR Codes:** The use of physical POS terminals in retail locations, combined with QR codes, has made it easier for small businesses to accept digital payments.

The Digital India initiative, launched in 2015, played a crucial role in promoting digital payments, through awareness campaigns, infrastructure development, and policy support.

#### Benefits of Digital Payment Systems

**1. Financial Inclusion:** Digital payment systems have been a significant enabler of financial inclusion, bringing banking services to the underserved and unbanked populations in rural areas.

**2. Reduced Dependency on Cash:** The widespread adoption of digital payment methods has helped reduce the dependence on cash, lowering the risks associated with cash handling such as theft, counterfeiting, and human errors.

**3. Transparency and Efficiency:** Digital transactions are more transparent and traceable than cash transactions, helping combat corruption, tax evasion, and black money. They also contribute to greater efficiency in government services and subsidies.

**4. Economic Growth:** The rise of digital payments has stimulated various sectors, particularly e-commerce, retail, and logistics. The in-

crease in online transactions has enabled businesses to scale rapidly, thereby fostering economic growth.

**5. Security and Safety:** Digital payments offer higher security, especially with technologies like encryption, two-factor authentication (2FA), and tokenization, reducing the risks involved in physical transactions.

#### Challenges in Digital Payments

Despite the rapid growth, several challenges continue to hinder the full realization of digital payments in India:

**1. Cybersecurity Concerns:** As digital payment systems increase in usage, so do the risks of cybercrimes such as fraud, hacking, and phishing. The growing number of users demands constant updates to security protocols and public awareness regarding safe online practices.

**2. Digital Literacy:** A significant portion of India's population, particularly in rural and semi-urban areas, lacks digital literacy. This limits the adoption of digital payments among older generations and less-educated individuals.

**3. Infrastructure Issues:** While urban centers have relatively advanced digital infrastructure, rural areas often face challenges such as low internet connectivity, erratic electricity, and limited access to smartphones.

**4. Trust Issues:** Many users remain wary of digital payment platforms due to fears of security breaches, fraud, or financial losses. Building trust through awareness campaigns and user-friendly platforms is essential for further growth.

**5. Regulatory and Legal Hurdles:** The legal framework surrounding digital payments is still evolving, with concerns over data privacy, cross-border transactions, and consumer protection. Clear and robust regulations are required to ensure the safety and stability of the system.

#### The Future of Digital Payment Systems in India

Looking ahead, India's digital payment ecosystem is expected to continue evolving in line with technological advancements. Several

trends indicate where the industry is heading:

• **Rise of Artificial Intelligence and Machine Learning:** AI and machine learning are expected to play an increasing role in enhancing fraud detection, improving user experience, and personalizing financial services.

• **Blockchain Technology:** Blockchain has the potential to revolutionize digital payments by ensuring greater security, transparency, and lower transaction costs.

• **Growth of Digital Currency:** The Reserve Bank of India (RBI) has announced plans for a central bank digital currency (CBDC), which could play a pivotal role in the future of digital payments by providing a sovereign-backed alternative to cryptocurrencies.

• **Increased Mobile and Internet Penetration:** As mobile phones and internet services reach more rural areas, the adoption of digital payments is expected to increase, further driving the cashless economy.

• **Integration of Cross-border Payments:** As e-commerce expands, the need for seamless cross-border transactions will become increasingly important. India is expected to develop its payment systems to facilitate smooth international transactions.

#### Suggestions -

#### Government Initiatives to be taken to Improve Digital Payments System in India –

While India's digital payment ecosystem has made impressive strides in recent years, there are still several challenges that need to be addressed to achieve universal adoption and smooth operation. Here are some suggestions to further enhance the digital payment system in India:

**1. Implementation of Advanced Encryption:** Encourage the adoption of state-of-the-art encryption technologies to protect transaction data and ensure secure communication between users, merchants, and payment providers.

**2. Robust Fraud Detection Systems:** Develop and integrate advanced machine learning-based

fraud detection systems that can identify and block suspicious activities in real-time.

**3. Public Awareness Campaigns:** Promote awareness among users regarding common cyber threats (such as phishing and malware) and teach best practices for online safety (e.g., using strong passwords, enabling two-factor authentication).

**4. Nationwide Digital Literacy Campaigns:** Implement nationwide campaigns to educate the population about digital payments, how to use payment platforms, and how to stay safe online. Localized campaigns in regional languages can make the information more accessible.

**5. Community Engagement:** Train community leaders and local influencers to guide people in rural and semi-urban areas on how to use digital payment systems and make them feel more comfortable with technology.

**6. Expand Internet Infrastructure:** The government and private companies should invest in improving broadband and mobile internet infrastructure, particularly in underserved rural and remote areas. This includes expanding 4G and 5G networks and providing affordable internet access.

**7. Simplified User Interfaces:** Design payment apps with simplified, intuitive user interfaces, especially for first-time users, the elderly, and those with limited technical knowledge. Visual aids, such as step-by-step guides and tooltips, can be helpful.

**8. Promote Microfinance Digital Platforms:** Encourage financial institutions to create microfinance platforms that allow individuals, especially small-scale farmers and rural entrepreneurs, to access loans, savings, and other financial products via mobile phones.

#### 9. Incentivize Cashless Transactions for Small Merchants

Small merchants, particularly in rural or semi-urban areas, often prefer cash transactions due to lower transaction costs and the ease of avoiding technical glitches. To encourage them

to adopt digital payments, incentives can play a key role.

**10. Insurance for Digital Transactions:** Introduce insurance schemes for consumers that cover losses due to cybercrime, unauthorized transactions, or fraud. This would help users feel more confident using digital payment systems.

**11. Link Government Welfare Programs to UPI/Aadhaar:** Link social welfare programs (e.g., subsidies, pension schemes) to UPI or Aadhaar-enabled payment systems, ensuring beneficiaries can receive benefits directly into their bank accounts without the need for physical cash.

**12. Promote Digital Currency (CBDC):** The Reserve Bank of India (RBI) has been exploring the idea of a Central Bank Digital Currency (CBDC). A digital version of the Indian rupee could be a game-changer, helping to build trust and reduce the reliance on traditional banking intermediaries.

### Conclusion

India's journey toward a digital payments ecosystem is a testament to the power of technology, innovation, and policy support. The country has made remarkable progress in driving financial inclusion, improving transparency, and fostering economic growth. However, challenges such as cybersecurity, digital literacy, and infrastructure need to be addressed to ensure that digital payments reach their full potential.

As the Indian government continues to focus on creating a digital-first environment and technological innovations evolve, the future of digital payment systems in India looks promising. The ongoing efforts to bridge gaps in infrastructure, education, and security will ensure that India remains at the forefront of the digital payment revolution.

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## Geographical and Socio-Economic Barriers to Digital Payment Adoption

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### Abstract

This research paper explores the geographical and socio-economic barriers that hinder the adoption of digital payment systems. Geographical barriers to digital payment adoption primarily include limited internet access, unreliable electricity supply, particularly in rural areas, which hinders the ability to use digital payment platforms due to poor connectivity and inconsistent power, ultimately impacting user trust and adoption of digital transactions. Socioeconomic factors affect individuals' adoption of digital payments. Income, education, and gender are the most important variables influencing the use of digital financial services in India. This research paper explores the geographical and socio-economic barriers that hinder the adoption of digital payment systems. By analyzing various studies and conducting surveys, the paper identifies key factors such as infrastructure, income disparity, and digital literacy that contribute to the digital divide. The findings suggest targeted interventions to enhance digital payment accessibility, ultimately promoting financial inclusion and economic growth.

**Keywords:** Digital payments, socio-economic barriers, geographical barriers, digital divide, fi-

nancial inclusion.

### Introduction

The digital payment landscape has evolved significantly over the past decade, driven by technological advancements and changing consumer preferences. Digital payment systems, including mobile wallets, online banking, and contactless payments, have become integral to modern financial transactions (Zhou et al., 2020). However, despite their rapid proliferation, a substantial portion of the global population remains unbanked or under banked, particularly in developing regions. According to the World Bank (2021), approximately 1.7 billion adults worldwide do not have access to formal financial services, highlighting a critical gap in financial inclusion.

Geographical barriers play a significant role in this digital divide. Rural areas often lack the necessary infrastructure to support digital payment systems, such as reliable internet connectivity and access to banking services. A study found that individuals in rural areas are less likely to adopt digital payment technologies due to these infrastructural limitations. The lack of physical banking institutions in remote areas further exacerbates this issue, as residents may have to travel long distances to access financial services.

Socio-economic factors also contribute to the barriers faced by individuals in adopting digital payment systems. Income disparity, education levels, and digital literacy are critical determinants of an individual's ability to engage with digital financial services. Research indicates that lower-income individuals are less likely to use digital payment systems due to financial constraints and a lack of understanding of the technology. This socio-economic divide is particularly pronounced in developing countries, where access to technology and financial education is limited.

The interplay between geographical and socio-economic barriers creates a complex land-

scape for digital payment adoption. Individuals in rural areas with low income and limited education face compounded challenges that hinder their ability to participate in the digital economy. As digital payments become increasingly essential for economic participation, addressing these barriers is crucial for promoting financial inclusion and economic growth.

This paper aims to investigate the geographical and socio-economic barriers to digital payment adoption, focusing on how these factors contribute to the digital divide. By understanding these barriers, stakeholders can develop targeted strategies to enhance financial inclusion and ensure that the benefits of digital payments are accessible to all. The following sections will explore the materials and methods used in this study, present the findings, and discuss the implications of the results.

## Materials and Methods

### · Research Design

This study employs a mixed-methods approach, combining quantitative surveys with qualitative interviews to gain a comprehensive understanding of the barriers to digital payment adoption. The quantitative component involves a structured survey distributed to a diverse demographic across urban and rural areas. This approach allows for the collection of numerical data that can be statistically analyzed to identify trends and correlations. The qualitative component includes in-depth interviews with key stakeholders, including financial service providers, policymakers, and users of digital payment systems, providing rich, contextual insights into the barriers faced by individuals.

### · Sample Selection

The survey targets individuals aged 18 and above, with a focus on varying income levels, educational backgrounds, and geographical locations. A total of 1,000 respondents were surveyed, with 600 from urban areas and 400 from rural areas. This stratified sampling method ensures that the study captures a di-

verse range of perspectives and experiences related to digital payment adoption. The qualitative interviews involved 20 participants selected based on their experience with digital payments, ensuring that the insights gathered are relevant and informed by real-world experiences.

### · Data Collection

Data were collected through online surveys and face-to-face interviews. The survey included questions on digital payment usage, barriers to adoption, and demographic information. The online survey platform allowed for efficient data collection and analysis, while face-to-face interviews provided an opportunity to explore participant experiences in greater depth. The interviews aimed to gather insights into personal experiences and perceptions regarding digital payments, focusing on the challenges faced by individuals in both urban and rural settings.

### · Data Analysis

Quantitative data were analyzed and identify trends and correlations. Descriptive statistics were employed to summarize the demographic characteristics of the respondents, while inferential statistics were used to assess the relationships between socio-economic factors and digital payment adoption. Qualitative data were analyzed to extract key themes related to barriers and facilitators of digital payment adoption. This mixed-methods approach allows for a comprehensive understanding of the factors influencing digital payment adoption, combining numerical data with rich qualitative insights.

## Literature Review

### · The Digital Divide

The digital divide refers to the gap between individuals who have access to digital technologies and those who do not (Warschauer, 2003). This divide is often influenced by geographical location, socio-economic status, and educational attainment (Hargittai, 2002). According to Vassilakopoulou (2021), the digital

divide is not merely a technological issue but a complex interplay of social, economic, and political factors that affect individuals' ability to access and utilize digital technologies. The divide manifests in various forms, including disparities in internet access, digital literacy, and the availability of digital financial services (Norris, 2001).

Research has shown that the digital divide disproportionately affects marginalized communities, particularly in developing countries (Warschauer, 2003). For instance, a study by van Dijk (2020) highlights that individuals in low-income households are less likely to have access to the internet and digital devices, which limits their ability to engage with digital payment systems. This lack of access perpetuates existing inequalities and hinders economic opportunities for these individuals (Burgess & Pande, 2005). Addressing the digital divide is essential for promoting financial inclusion and ensuring that all individuals can benefit from the advantages of digital payment technologies (Kumar et al., 2021).

#### · **Geographical Barriers**

Geographical barriers significantly impact digital payment adoption, particularly in rural areas. Research indicates that rural communities often lack the necessary infrastructure to support digital transactions, such as reliable internet connectivity and access to banking services. The absence of physical banking institutions in remote areas further exacerbates this issue, as residents may have to travel long distances to access financial services. This geographical isolation can lead to a reliance on cash transactions, limiting individuals' ability to participate in the digital economy.

Moreover, the quality of internet connectivity varies significantly between urban and rural areas. A report by the International Telecommunication Union (ITU, 2021) found that while urban areas enjoy high-speed internet access, rural areas often face slow and unreli-

able connections. This disparity in connectivity not only affects digital payment adoption but also impacts access to other essential services. To bridge this gap, targeted investments in infrastructure development are necessary to ensure that rural communities can access digital payment systems.

#### · **Socio-Economic Barriers**

Socio-economic factors, including income levels, education, and digital literacy, play a critical role in determining an individual's ability to adopt digital payment systems. Research indicates that lower-income individuals are less likely to use digital payment systems due to financial constraints and a lack of understanding of the technology. This socio-economic divide is particularly pronounced in developing countries, where access to technology and financial education is limited.

Digital literacy is a crucial determinant of digital payment adoption. A study found that individuals with higher levels of education are more likely to engage with digital payment systems, as they possess the skills necessary to navigate these technologies. Conversely, individuals with limited education may struggle to understand how to use digital payment platforms, leading to reluctance in adopting these systems. Addressing the socio-economic barriers to digital payment adoption requires targeted educational initiatives that focus on enhancing digital literacy among underserved populations.

#### **Previous Studies**

Previous research has highlighted the importance of addressing both geographical and socio-economic barriers to promote financial inclusion. Heeks (2022) emphasizes the need for targeted interventions that consider the unique challenges faced by different demographic groups. For instance, financial institutions can develop user-friendly digital payment solutions tailored to the needs of low-income populations, ensuring that these systems are

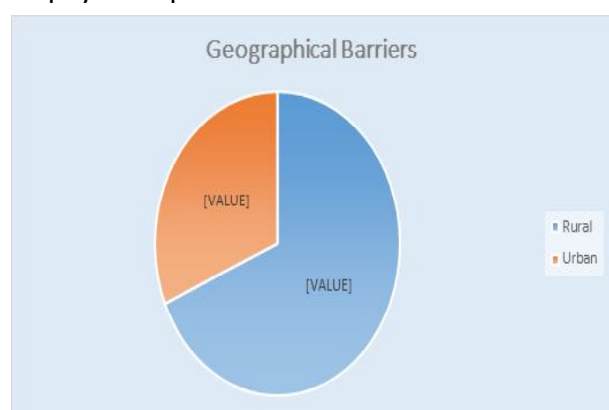
accessible and easy to use.

Additionally, studies have shown that community-based initiatives can play a significant role in promoting digital payment adoption. A report by the Consultative Group to Assist the Poor (CGAP, 2020) highlights successful case studies where local organizations have provided training and support to individuals in underserved communities, helping them to navigate digital payment systems. These initiatives not only enhance digital literacy but also build trust in digital financial services, encouraging greater adoption among hesitant users (Kumar et al., 2021).

## Results

### Survey Findings

The survey results indicate that 68.6 % of urban respondents use digital payment systems regularly, compared to only 31.4 % of rural respondents. This contrast highlights the significant impact of geographical barriers on digital payment adoption. Key barriers identified by rural respondents include a lack of internet access, digital literacy challenges, and financial resources. Specifically, 40% of rural respondents reported unreliable internet connectivity, which severely limits their ability to engage with digital payment platforms.



Digital literacy emerged as another critical barrier, with 31.4 % of rural respondents expressing difficulty in understanding how to use digital payment systems. This finding aligns with previous research indicating that individu-

als with lower levels of education are less likely to adopt digital technologies. Furthermore, 40% of rural respondents indicated that they could not afford the necessary technology, such as smartphones or internet subscriptions, further exacerbating the digital divide.

### Interview Insights

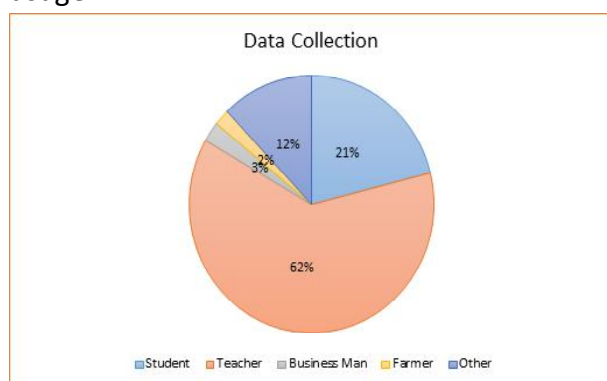
Qualitative interviews revealed deeper insights into the barriers faced by individuals in adopting digital payment systems. Many rural respondents shared experiences of frustration with the lack of support from financial institutions in educating them about digital payments. Participants expressed a desire for more accessible information and training on how to use these technologies effectively. This aligns with findings which emphasize the importance of tailored educational initiatives to address the unique challenges faced by different demographic groups.

Additionally, several interviewees highlighted the importance of trust in digital payment systems, particularly among older adults. Many older respondents expressed concerns about the security of digital transactions and the potential for fraud. This apprehension can significantly hinder adoption rates, as individuals may prefer the familiarity and perceived safety of cash transactions. Building trust through transparent communication and robust security measures is essential for encouraging greater adoption of digital payment systems.

Moreover, the interviews revealed that community-based initiatives could play an important role in promoting digital payment adoption. Participants noted that local organizations and community leaders could help bridge the gap by providing training and support tailored to the needs of their communities. This approach aligns with the findings of, which highlight successful case studies where local organizations have effectively promoted digital financial services through targeted outreach and education.

The interviews also underscored the need for collaboration between financial institutions and community organizations. Many respondents expressed a desire for financial institutions to take a more active role in educating potential users about digital payment options. By partnering with local organizations, financial institutions can leverage existing trust and relationships within communities to promote digital payment adoption more effectively.

Finally, the qualitative data revealed that personal experiences and peer influence significantly impact individuals' willingness to adopt digital payment systems. Many respondents mentioned that seeing friends or family successfully using digital payments encouraged them to try these technologies themselves. This social aspect of technology adoption highlights the importance of community engagement and support in fostering a culture of digital payment usage.



## Discussion

### · Infrastructure Development

The findings of this study underscore the critical need to address both geographical and socio-economic barriers to digital payment adoption. Investing in infrastructure is essential for enhancing digital payment accessibility, particularly in rural areas. Governments and private sector stakeholders should collaborate to improve internet connectivity and establish more banking facilities in underserved regions. Moreover, targeted investments in infrastructure development can have broader economic benefits.

Improved connectivity can facilitate access to various services, including education and healthcare, ultimately contributing to overall community development. A report by the International Telecommunication Union (ITU, 2021) highlights that enhancing digital infrastructure can lead to increased economic opportunities and improved quality of life for individuals in rural areas.

### · Education and Training

To bridge the digital literacy gap, targeted educational programs should be implemented. These programs can focus on teaching individuals how to use digital payment systems effectively, emphasizing the benefits and security of these technologies. Community workshops and online tutorials can be valuable resources for enhancing digital skills. Research indicates that educational initiatives can significantly improve digital literacy levels, leading to increased adoption of digital payment systems among underserved populations.

Additionally, financial institutions should take an active role in promoting digital literacy. By providing training sessions and resources, they can empower individuals to navigate digital payment platforms confidently. This proactive approach can help build trust in digital financial services, addressing the concerns expressed by many respondents regarding security and usability.

## Conclusion

The adoption of digital payment systems is hindered by significant geographical and socio-economic barriers. Addressing these challenges is crucial for promoting financial inclusion and ensuring that the benefits of digital payments reach all segments of society. By investing in infrastructure, enhancing digital literacy, and implementing supportive policies, stakeholders can work towards a more inclusive financial ecosystem. The findings of this study highlight the importance of a multi-faceted approach that considers the unique challenges

faced by different demographic groups, ultimately fostering greater participation in the digital economy.

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08

## Awareness of Cyber Security and Digital Frauds especially in Rural India

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### Abstract-

The practice of safeguarding computer networks, systems, and data from online threats, illegal access, theft, damage, and interruption is known as cyber security. It entails putting in place a number of safeguards, instruments, and tactics to guarantee the privacy, availability, and integrity of data as well as to protect against online dangers including malware, phishing, hacking, and data breaches.

Raising awareness about **cyber security and digital frauds** in **rural India** is crucial, as digital penetration increases through smartphones, online banking, and government digital initiatives like **Digital India** and **Jan Dhan Yojana**. However, a lack of digital literacy makes people in rural areas more vulnerable to online scams, financial frauds, and identity theft. To reduce online scams, financial frauds digital literacy in rural areas plays a vital role.

**Keywords-** Malware, cyber security, phishing, hacking, data breaches.

### Introduction-

As India moves towards digital transformation, ensuring cybersecurity awareness in rural areas is **not just a necessity but a priority**. A **combined effort** from the government, banks, local authorities, and NGOs can empower rural citizens to use digital platforms **safely and confidently**.

### Key Cyber security Threats in Rural India

1. Fake calls, phishing links, and unauthorized UPI transactions trick people into revealing their bank details.
2. Fraudulent messages or emails pretending to be from banks, government agencies, or relatives, asking for OTPs or account details.
3. Fake calls asking to "update KYC details" to prevent bank account blockage, leading to fund theft.
4. Fraudsters promise instant loans or jobs, asking for an advance payment or personal details.
5. Downloading apps from unknown sources that steal data or control the phone.
6. Scammers duplicate SIM cards to bypass OTP-based security measures and access accounts.

### Challenges in Rural Areas

- Many first-time internet users are unaware of online threats.
- Fewer cyber security training sessions in villages compared to urban areas.
- Rural communities often trust people blindly, making them easy targets.
- Many scam alerts are in English or Hindi, making them hard to understand for regional language speakers.

### How to Create Awareness?

1. Conduct workshops in local languages via schools, Panchayats, and NGOs.
2. Spread awareness through radio, community meetings, and local newspapers.
3. Organize bank-led campaigns about safe online transactions.
4. Share warnings about recent scams in village WhatsApp groups.
5. Teach people to enable OTP and biometric security for banking.
6. Educate people to report frauds via **cybercrime.gov.in** or local police.

### Objectives-

To enhance Digital Literacy in rural areas

To Prevent users from Financial Frauds

To Encourage Government & Bank Collaboration

To Develop Cyber Resilience

### Research Methodology-

A structured research methodology is essential to study cyber security awareness lev-

els in rural India, identify key challenges, and implement effective solutions. Below is a detailed approach:

### 1. Research Design

A **mixed-methods approach** (quantitative + qualitative) will be used to assess cyber security awareness, identify fraud trends, and develop intervention strategies.

- **Descriptive Research** – To analyze the current level of digital literacy and cyber fraud cases.

- **Exploratory Research** – To identify the factors contributing to cyber fraud vulnerability in rural areas.

### 2. Data Collection Methods

#### A. Primary Data Collection (Field Research)

##### Surveys & Questionnaires

Questions will assess awareness of online banking, digital payments, and common fraud types.

##### Interviews & Focus Group Discussions (FGDs)

Personal interviews with victims of cyber fraud.

FGDs with Panchayat leaders, bank officials, teachers, and NGOs to understand challenges and solutions.

##### Field Observations

Visit local cybercafés, banks, and digital service providers to observe common practices.

#### B. Secondary Data Collection (Existing Literature & Reports)

##### Government Reports & Data-

Study reports from **RBI, CERT-In, NCRB, Digital India**, and **Ministry of Electronics & IT (MeitY)**.

##### Academic Research & Articles

Review research papers on cybersecurity and digital literacy in rural areas.

##### NGO & Financial Institution Reports

Utilize reports from banks, fintech companies, and rural development NGOs on digital financial security.

### 3. Sampling Strategy

- **Target Population:** Rural individuals using smartphones, digital payments, and online banking.

- **Sampling Method:** Stratified random sampling to ensure representation across different demographics (age, gender, education level).

- **Sample Size:** A minimum of 500 respondents across multiple rural regions for broader insights.

### 4. Data Analysis Methods

#### Quantitative Analysis

Use statistical tools (SPSS, Excel) to analyze survey responses and detect trends.

Identify key cyber security challenges based on numerical data.

#### Qualitative Analysis

Thematic analysis of interviews and focus group discussions.

Identify patterns in fraud cases and behavioral gaps in digital security.

#### Comparative Analysis

Compare cyber security awareness levels before and after awareness programs.

### 5. Implementation of Awareness Programs

Based on research findings, awareness programs will be designed with:

- **Workshops & Training Sessions** (in local languages).

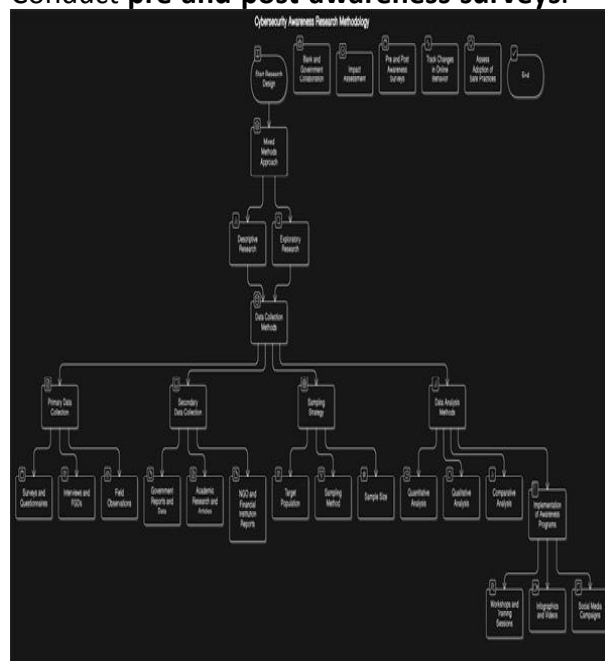
- **WhatsApp & Social Media Campaigns** for rural areas.

- **Bank & Government Collaboration** for cybersecurity initiatives.

### 6. Impact Assessment

To measure the effectiveness of awareness programs:

Conduct **pre and post-awareness surveys**.



**Findings and Suggestions-****Findings**

Many rural users are first-time smartphone and internet users.

Lack of understanding of safe online banking, digital payments, and cyber risks.

Rural people tend to trust calls, messages, or websites claiming to be from banks, government, or relatives.

Fake SMS/emails asking for OTPs, bank details, or Aadhaar numbers.

Fraudsters call asking to “update KYC” to avoid account blockage.

Few targeted government or NGO-driven cybersecurity awareness programs in rural areas.

Existing programs often fail due to language barriers or complex terminology.

Awareness about **Cybercrime Helpline 1930** and **cybercrime.gov.in** is very low.

**Suggestions**

Organize cybersecurity awareness workshops in schools, Panchayats, and self-help groups (SHGs).

Use **local languages and simple demonstrations** to teach safe online banking and digital payments.

Spread awareness via **community radio, village WhatsApp groups, and local newspapers**.

Leverage **gram panchayats and Anganwadi workers** to educate people on cyber threats.

Spread awareness about the **Cyber Crime Helpline (1930) and cybercrime.gov.in** for reporting fraud.

Provide legal support and counseling for cyber fraud victims.

Train **village leaders, teachers, and youth** to spread cybersecurity awareness.

**Conclusion-**

By implementing these suggestions, rural India can become more **digitally secure and fraud-resistant**. A combined effort from the gov-

ernment, banks, local authorities, NGOs, and the community is essential to build a **cyber-aware rural population**.

**References-****1) Government Reports & Official Sources**

Ministry of Electronics and Information Technology (MeitY) – <https://www.meity.gov.in>  
 Reserve Bank of India (RBI) – <https://www.rbi.org.in>

Indian Computer Emergency Response Team (CERT-In) – <https://www.cert-in.org.in>

Cyber Crime Reporting Portal – Government of India – <https://www.cybercrime.gov.in>

National Crime Records Bureau (NCRB) – <https://ncrb.gov.in>

Digital Saksharta Abhiyan (PMGDISHA) – Pradhan Mantri Gramin Digital Saksharta Abhiyan – <https://www.pmgdisha.in>

**2) Research Papers & Academic References**

“Cybersecurity Awareness and Digital Fraud in Rural India” – A study on digital fraud cases and awareness levels in villages.

“Cyber Threats and Digital Literacy: A Study in Indian Rural Regions” – Analysis of cyber fraud vulnerability in rural populations.

“Impact of Digital Banking and Cyber Frauds on Rural Users” – Research paper on bank

**3) Media Reports & Articles**

Press Information Bureau (PIB) – Government of India – <https://pib.gov.in>

The Hindu, Times of India, Economic Times

Financial Express, Business Standard

**4) NGO & Financial Institution Reports**

NASSCOM Cyber Security Task Force – <https://www.nasscom.in>

RBI’s Financial Literacy and Cyber Security Awareness Initiatives

CyberPeace Foundation (NGO) – <https://www.cyberpeace.org>

## Rural Business with Digital Transactions: A Study on Bank of Maharashtra

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### Abstract

The rapid advancement of digital transactions has transformed rural business operations, enhancing efficiency, security, and financial inclusion. This study examines the impact of digital payment systems on rural enterprises, with a focus on the Bank of Maharashtra's role in promoting digital banking solutions. Through mobile banking, UPI services, POS terminals, and financial literacy programs, the bank facilitates digital adoption among rural businesses. The study identifies key challenges such as infrastructure gaps, digital literacy issues, and cybersecurity concerns. Using primary and secondary data, the research analyzes digital payment trends and their effects on business profitability. Findings suggest that digital transactions significantly improve financial management and business sustainability. The study also offers recommendations to enhance digital financial services for rural entrepreneurs.

**Keywords:** Rural Business, Digital Transactions,

Bank of Maharashtra, Digital Payment Systems etc.

### 1. Introduction:

The advent of digital transactions has revolutionized business operations across various sectors. In rural areas, where cash transactions traditionally dominated, digital payment systems have introduced efficiency, security, and financial inclusion. With the increasing penetration of smartphones and internet connectivity, rural businesses are gradually shifting towards digital transactions, enhancing their operational efficiency and financial management. Banking institutions play a pivotal role in facilitating this transition, ensuring that rural entrepreneurs and businesses can leverage digital platforms for seamless financial transactions. The Bank of Maharashtra, as a prominent public sector bank, has actively promoted digital payment solutions through initiatives such as mobile banking, UPI services, POS terminals, and financial literacy programs. By providing easy access to digital banking tools, the bank has enabled rural businesses to integrate modern financial technologies into their daily operations.

This paper investigates the role of digital transactions in fostering rural business growth, with a specific focus on the Bank of Maharashtra's contribution to promoting digital payments. It examines how digital financial tools impact business efficiency, profitability, and sustainability in rural markets. Additionally, the study explores the challenges faced by rural enterprises in adopting digital transactions and suggests possible solutions to enhance their adoption. Through an empirical analysis, this research aims to provide valuable insights into the evolving financial landscape of rural businesses and the strategic role of banking institutions in driving digital financial inclusion.

### 2. Profile of the Bank:

Maharashtra has a long history of commercial and banking activities, with the first

commercial bank, the Bank of Bombay, established in 1840. The state's banking sector saw significant growth, but many banks collapsed during the Great Depression. The Maharashtra Chamber of Commerce (MCC) played a key role in advocating for a dedicated bank for Maharashtra. In 1935, the Bank of Maharashtra (BOM) was formally registered, with efforts led by visionaries like Shri A.R. Bhat and Shri V.P. Varde. The Dharam Peth branch of BOM in Nagpur is strategically located and offers various banking services, including personal, business, and agricultural banking. The branch also supports government financial inclusion schemes and embraces digital banking technology. BOM's mission is to provide efficient customer service, innovate financial products, and expand globally. Its vision is to be a modern, customer-centric, and technology-driven bank. Strategically, the Dharam Peth branch focuses on expanding its customer base, enhancing financial performance, supporting local economic development, and leveraging technology for better services. The bank has received several prestigious awards, including the **National MSME Award 2022**, recognition for promoting government schemes, and the **APY Annual Excellence Achiever Award 2023-24** for its contributions to the Atal Pension Yojana. BOM continues to grow with a strong focus on digital transformation, community engagement, and financial innovation.

### 3. Scope of the Research Paper:

This research paper examines the impact of digital transactions on rural business operations, focusing on the role of the Bank of Maharashtra. It explores the adoption of digital payment systems, financial inclusion, and operational efficiency in rural enterprises. The study identifies key challenges such as infrastructure gaps and digital literacy issues. It also evaluates the Bank of Maharashtra's initiatives in promoting digital transactions. The findings aim to provide insights for policymakers and fi-

nancial institutions to enhance digital financial services in rural areas.

**4. Hypothesis: 'The adoption of digital transactions has a positive impact on the rural businesses supported by the Bank of Maharashtra'.**

### 5. Objectives of the Study

1. To analyze the impact of digital transactions in enhancing rural businesses.
2. To examine the role of the Bank of Maharashtra in promoting digital payments.
3. To identify challenges faced by rural businesses in adopting digital payment systems and suggest possible solutions.

### 6. Literature Review:

The online payment system has transformed banking operations, particularly in rural areas, by enabling fast, secure, and convenient transactions. Studies highlight that digital payment methods such as **UPI, mobile banking, internet banking, and digital wallets** have improved financial inclusion, reducing dependence on cash-based transactions (RBI, 2022). Research by Sharma & Gupta (2021) emphasizes that online payments enhance rural business efficiency by minimizing transaction costs and increasing transparency.

Despite these benefits, challenges such as **lack of digital literacy, cybersecurity risks, and unreliable internet connectivity** remain barriers (World Bank, 2023). Studies suggest that government initiatives like **Digital India and PMJDY (Pradhan Mantri Jan Dhan Yojana)** have significantly boosted the adoption of digital banking in rural regions (Singh et al., 2020). Bank of Maharashtra has played a crucial role in promoting digital transactions through mobile banking services, POS terminals, and awareness campaigns, enabling rural businesses to participate in the digital economy.

### 7. Research Methodology:

This study follows a **descriptive research design** to analyze the impact of digital payment systems at the Dharam Peth Branch of

Bank of Maharashtra. A **sample of 150 customers** is selected using **convenience sampling**. **Primary data** is collected through structured **questionnaires** and **interviews** with bank customers and employees, while **secondary data** is sourced from **bank records, reports, and publications**. Data is analyzed using **percentage methods, charts, and qualitative feedback analysis**. The study is limited to a **single branch**, and findings may not represent the entire bank's performance in digital payments.

### 8. Data Analysis and Interpretation:

This section analyzes and interprets data collected from respondents at the Dharam Peth Branch regarding digital payment usage. It examines demographic factors, preferred payment methods, benefits, user experiences, and challenges faced. The findings reveal key trends in digital transaction adoption, highlighting security, convenience, and awareness as major factors. Understanding these insights will help financial institutions improve digital services, address technical and security concerns, and enhance user satisfaction. The interpretation provides actionable recommendations to promote digital payment awareness and accessibility.

**Table 1 Demographic Profile**

| Sr. | Particular | Frequency | Percentage |
|-----|------------|-----------|------------|
| A   | Age        |           |            |
| 1   | Below 25   | 21        | 14%        |
| 2   | 25-35      | 57        | 38%        |
| 3   | 36-50      | 45        | 30%        |
| 4   | Above 50   | 27        | 18%        |
| 5   | Total      | 150       | 100%       |
| B   | Gender     |           |            |
| 1   | Male       | 63        | 42%        |
| 2   | Female     | 87        | 58%        |
| 3   | Other      | 0         | 0%         |
| 4   | Total      | 150       | 100%       |
| B   | Occupation |           |            |
| 1   | Salaried   | 41        | 27.33%     |
| 2   | Business   | 12        | 8%         |
| 3   | Student    | 35        | 23.33%     |
| 4   | Retired    | 23        | 15.34%     |
| 5   | Housewife  | 39        | 26%        |
| 6   | Total      | 150       | 100%       |

(Sources: Field Work Data)

The demographic profile indicates that the majority of respondents (38%) are aged between **25-35 years**, followed by **30% in the 36-50 age**

**group**, showing that middle-aged individuals are the primary users of digital payments. **Females (58%) outnumber males (42%)**, suggesting higher adoption of digital banking services among women. In terms of occupation, **salaried individuals (27.33%)** and **housewives (26%)** form the largest user groups, indicating a preference for digital transactions among those managing household expenses and fixed incomes. Notably, **students (23.33%)** also show significant engagement, highlighting the growing reliance on digital payments among younger generations.

**Table 2 Digital Payment Usage**

| Sr. | Digital Payment Usage        | Frequency | Percentage |
|-----|------------------------------|-----------|------------|
| 1   | Mobile Banking               | 46        | 30.66%     |
| 2   | UPI (Unified Payment System) | 14        | 9.34%      |
| 3   | Internet Banking             | 39        | 26%        |
| 4   | Credit/Debit Card Payment    | 33        | 22%        |
| 5   | Digital Payment              | 18        | 12%        |
| 6   | Total                        | 150       | 100%       |

(Sources: Field Work Data)

The data reveals that **mobile banking (30.66%)** is the most preferred digital payment method among customers at the Dharam Peth Branch, followed by **internet banking (26%)** and **credit/debit card payments (22%)**. Surprisingly, **UPI usage remains low at 9.34%**, despite its growing popularity nationwide, indicating a need for greater awareness and promotion. **Other digital payment methods account for 12%**, suggesting a diverse but uneven adoption of digital transaction options. The findings highlight an opportunity for the bank to enhance customer education on UPI and other digital payment solutions to improve adoption and accessibility.

**Table 3 Digital Payment Methods**

| Sr. | Digital Payment Methode   | Frequency | Percentage |
|-----|---------------------------|-----------|------------|
| 1   | UPI                       | 83        | 55.66%     |
| 2   | Mobile Banking App        | 27        | 18%        |
| 3   | Internet Banking          | 13        | 8.66%      |
| 4   | Debit/Credit Card Payment | 17        | 11.33%     |
| 5   | E-Wallets                 | 10        | 6.66%      |
| 6   | Total                     | 150       | 100%       |

(Sources: Field Work Data)

The analysis of digital payment meth-

ods indicates that **UPI (55.66%)** is the most preferred mode, highlighting its convenience, speed, and ease of use. **Mobile banking apps (18%)** remain a significant choice, showing that many users prefer direct bank transactions. **Debit/credit card payments (11.33%)** and **internet banking (8.66%)** have moderate adoption, reflecting their continued but declining relevance. **E-wallets (6.66%)** have the lowest preference, possibly due to limited incentives or integration. Overall, the dominance of UPI suggests a shift toward instant, hassle-free digital transactions, signaling potential areas for banks to enhance other payment methods.

Table 4 Benefits of Digital Payment

| Sr. | Benefits of Digital Payment | Frequency | Percent age |
|-----|-----------------------------|-----------|-------------|
| 1   | Convenience & Time saving   | 37        | 24.66%      |
| 2   | 24/7 Availability           | 43        | 28.66%      |
| 3   | Security & Transparency     | 53        | 35.33%      |
| 4   | Rewards & Cashback Offers   | 17        | 11.33%      |
| 5   | Total                       | 150       | 100%        |

(Sources: Field Work Data)

The analysis of digital payment benefits shows that **security and transparency (35.33%)** are the top priorities for users, emphasizing the trust factor in digital transactions. **24/7 availability (28.66%)** is another major advantage, reflecting the need for flexible and anytime-accessible payment options. **Convenience and time-saving (24.66%)** also play a crucial role, making transactions quicker and hassle-free. **Rewards and cashback offers (11.33%)** are the least significant factor, indicating that while incentives are appealing, users value safety and accessibility more. Overall, the data suggests that trust and ease of use are the key drivers for digital payment adoption.

Table 5 Experience of Digital Payment Services:

| Sr. | Experience of Digital Payment Services | Frequency | Percentage |
|-----|----------------------------------------|-----------|------------|
| 1   | Excellent                              | 49        | 32.66%     |
| 2   | Good                                   | 40        | 26.66%     |
| 3   | Average                                | 33        | 22%        |
| 4   | Poor                                   | 28        | 18.66%     |
| 5   | Total                                  | 150       | 100%       |

(Sources: Field Work Data)

The analysis of digital payment service

experiences reveals that **59.32% of users (Excellent + Good)** are satisfied, indicating the reliability and efficiency of these services. However, **22% rated their experience as Average**, suggesting areas that need improvement. Notably, **18.66% of respondents reported a Poor experience**, highlighting challenges such as transaction failures, security concerns, or technical difficulties. This data suggests that while digital payments are widely accepted and appreciated, service providers must address user concerns to enhance overall satisfaction.

Table 6 Challenges Faced While Using Digital Payment

| Sr. | Challenges Faced While Using Digital Payment | Frequency | Percentage |
|-----|----------------------------------------------|-----------|------------|
| 1   | Technical Glitches                           | 56        | 38.66%     |
| 2   | Lack of User-Friendliness in the interface   | 23        | 15.33%     |
| 3   | Concerns about Security and Fraud            | 28        | 18.66%     |
| 4   | Lack of awareness                            | 41        | 27.33%     |
| 5   | Total                                        | 150       | 100%       |

(Sources: Field Work)

The analysis of challenges in digital payments shows that **38.66% of users face technical glitches**, making it the most significant barrier to smooth transactions. **Lack of awareness (27.33%)** indicates a need for better education and training on digital payment systems. **Security and fraud concerns (18.66%)** highlight user apprehensions about data protection and financial safety. Additionally, **15.33% of respondents find digital payment interfaces not user-friendly**, suggesting a need for improved design and accessibility. Addressing these issues through better technology, awareness campaigns, and enhanced security measures can significantly improve user adoption and satisfaction.

## 9. Specific Suggestions:

1. Conduct awareness programs to educate rural customers on the benefits and security of digital transactions (**Increase Digital Literacy**).
2. Collaborate with telecom providers to enhance network infrastructure in rural areas (**Improve Internet Connectivity**).

3. Strengthen fraud prevention systems and educate users on safe digital banking practices (**Enhance Cybersecurity Measures**).

4. Develop user-friendly, multilingual mobile banking applications for easy accessibility (**Simplify Banking Apps**).

5. Provide cashback, discounts, and rewards to encourage digital payment adoption (**Offer Digital Transaction Incentives**).

· **Conceptual Model:**

*Start → Identify Rural Business Needs → Assess Digital Infrastructure → Develop Awareness and Training Programs → Implement Digital Payment Solutions → Provide Banking and Technical Support → Monitor Adoption and Challenges → Improve and Expand Services → End*

This conceptual model outlines a structured approach to enhancing digital transactions in rural businesses. It begins with identifying business needs and assessing digital infrastructure, followed by developing awareness and training programs. The model then focuses on implementing digital payment solutions, providing banking and technical support, monitoring adoption challenges, and continuously improving services to ensure sustainable growth.

**10. Conclusion and Recommendations:**

The study reveals that while digital banking has made significant inroads into rural areas, several challenges still hinder its full adoption. Factors such as digital illiteracy, limited internet connectivity, cybersecurity concerns, and resistance to change have slowed the growth of digital banking in rural regions. However, with targeted efforts, these barriers can be overcome to enhance financial inclusion. It is crucial for banks and policymakers to focus on awareness programs, infrastructure development, and simplified banking solutions to encourage rural adoption. Strengthening cybersecurity measures and providing incentives for digital transactions can further boost trust and engagement. Additionally, collaboration

between financial institutions and technology providers can create user-friendly banking solutions suited for rural populations. By addressing these challenges, digital banking can become a powerful tool for economic development and financial empowerment in rural communities.

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10

## CYBER CRIME AND CYBER SECURITY REGARDING DIGITAL PAYMENT

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### Abstract –

Cybercrime is the illegal activity relating to computers, the internet or connected devices. Cybersecurity aims to protect computer systems, applications, devices, data, financial assets and people against ransom ware and other malware, phishing scams, data theft and other cyberthreats. USSD, Micro ATM, POS are the recent systems introduced in digital payment in India. Government has introduced various awareness programs to boost of digital payments like 'DIGISHALA' broadcasting channel, "VITTIYA SAKSHARTA ABHIYAN" AND "COMMAON SERVICE CENTER". During the last 5 months (April-August) of the current financial year 2024 - 25, the transaction volume has reached to 8,659 crore. Billions of Dollar Lost - The top attacks of recent years shows just how nefarious and damaging cybercrime has become. Vishing (seek personal information of customer through a phone call) is the very frequent cyber crime in India. Additionally, making use of electronic signature, password or any other unique identification feature of person. Financial frauds worth Rs 5574 crore were reported between January and October 2023, significantly higher than 2022 (Rs 2,296 crore in full years). CERT has advised for Mobile banking malware – antimalware protection mobile, security software, update banking app software, emails or text messages should be ignored; bank

account number or IPIN should not be stored on the user's mobile phone.

**Keywords** – HACKERS – UPI PAYMENT - MOBILE WALLETS - COMMON SERVICE CENTERS – BILLION OF DOLLORS LOST – VISHING – PHISHING – ANTI - MALWARE PROTECTION – STRONG PASSWAORD

### Introduction –

Cybercrime is the illegal activity relating to computers, the internet or connected devices. Any illegal act where particular information of computer technology is necessary for its perpetration and inquiry. Cyber crime is the new dimensional crime through help of computer. Cybercriminal are those who conduct cybercrimes. They may be IT professionals, hobby hackers, politically motivated, terrorist organization, financially motivated hackers, psychological perverts, national espionage, organized criminals etc.

Cyber security insists the technologies, practices and policies for preventing cyber attacks on their impact. Cyber security aims to save from harm the computer systems, applications, devices, data, financial assets and people against ransom ware and other malware, phishing scams, data theft and other cyber threats.

### Objectives of the Study –

1. To study the Cyber crime regarding digital payment system in India
2. To study about cyber security mechanism against cyber crime.

**Methodology** - Researcher used secondary data for collection of information. The researcher has collect necessary information from the books, Journals, Magazines, Internet, Newspapers, and Articles.

### Digital Payment methods –

1. **UNSTRUCTURED SUPPLEMENTARY SERVICE DATA (USSD)** - This service allows mobile banking transactions using basic feature mobile phone, there is no need to have mobile internet data facility for using USSD based mobile bank-

ing. \*99# service includes, interbank account to account fund transfer, balance enquiry, mini statement besides host of other services.

## **2 BANKING CARDS (DEBIT / CREDIT / CASH / TRAVEL / OTHERS) –**

## **3 AADHAAR ENABLED PAYMENT SYSTEM (AEPS) –**

## **4. UNIFIED PAYMENTS INTERFACE (UPI) -**

**5. MOBILE WALLETS** - Instead of using your physical plastic card to make purchases, you can pay with your Smartphone, tablet, or smart watch.

## **6. BANKS PRE-PAID CARDS-**

**7. POINT OF SALE** - retailers consider a POS to be the area where a customer completes a transaction, such as a checkout counter.

## **8. INTERNET BANKINGS -**

## **9. MOBILE BANKING -**

**10. MICRO ATMS** - The platform will enable Business Correspondents (who could be a local kirana shop owner and will act as 'micro ATM') to conduct instant transactions.

## **Government's awareness programs for digital payments**

**DIGISHALA – EDUCATIONAL TV CHANNEL FOR DIGITAL PAYMENTS ON DD FREE DISH**

**Digital Finance for Rural India: Creating Awareness and Access through Common Service Centers (CSCs)**

**VITTIYA SAKSHARTA ABHIYAN (VISAKA)**

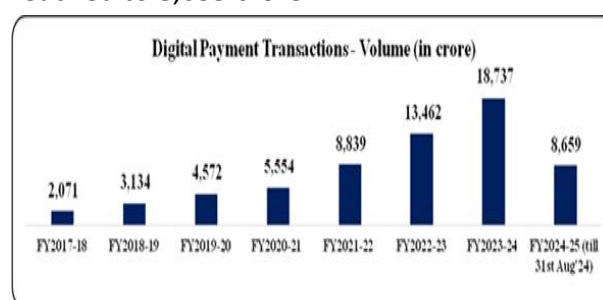


**Source** - <https://egovernance.vikaspedia.in/viewcontent/e-governance/digital-payment/best-practices-in-promoting-digital->

payments?lgn=en

## **Growth of Digital Payment Transactions:**

Digital payments in India have witnessed noteworthy growth, with the total number of digital payment transactions increased from 2,071 crore in FY 2017-18 to 18,737 crore in FY 2023 - 24 at Compounded Annual Growth Rate (CAGR) of 44%. Additionally, during the last 5 months (April - August) of the current financial year 2024 - 25, the transaction volume has reached to 8,659 crore.



Source: RBI, NPCI & Banks Ref:

[https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2057013#::~:~:text=Digital%20payments%20in%20India%20have,\(CAGR\)%20of%2044%25.](https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2057013#::~:~:text=Digital%20payments%20in%20India%20have,(CAGR)%20of%2044%25.)

## **Brief history of Cyber Crime –**

**The 1962** - cyber crime began when Allen Scherr launched a cyber attack against the MIT computer networks, theft passwords from their database by the use of punch card.

## **The 1990s: New Technology Brings New Crime**

- Attackers were enjoying fresh opportunities and devising new means to gain unconstitutional access to systems and operate data across the web.

## **The 2000s New Millennium: Cybercrime Ramps Up**

-The evolution of cybercrime meant new viruses and worms, which caused major harm to vital sectors of the global, digital economy.

## **2010s: An blast of Cyber Attacks**

- Digital currencies such as Bitcoin, the digitizing of organizations, and the explosion of mobile devices, new operating systems, and the dark web, gave hazard actors new avenues and resources for

attacks.

**2020 to Today: Billions of Dollars Lost** - The top attacks of latest years show just how nefarious and damaging cybercrime has become serious issue.

**Cyber crimes regarding digital fraud –**

1. **Cyber Stalking** – Use of electronic communication by a person to follow a person to promote personal interaction repeatedly despite a clear indication of disinterest by such a person.

2. **Vishing** – Is an attempt whether fraudster try to seek personal information like customer id, net banking password, ATM pin, OTP, card expiry date, CVV through a phone call.

3. **Smshing** – It is type of fraud that uses mobile phone text message to tempt losses into calling back, visiting fraudulent websites or downloading malicious content via phone or web.

4. **Sim Swap Scam** – When fraudsters get a new SIM card issued against a registered mobile number fraudulently through mobile service providers. With help of SIM they get OTP and alerts required to making financial transaction through victims bank account.

5. **Debit – Credit card fraud** – It involves an unauthorized use of debit/credit card information for the purpose of purchasing or withdrawing funds from it.

6. **Impersonal and Identity theft** – It is an act of fraudulence applied the electronic signature, password or any other unique identification feature of person.

7. **Phising** – It involves pilfering personal information such as customer id, PIN, Debit – Credit card number etc.

8. **Spamming** – Someone receive illegal commercial message through various electronic media. They may attempt to trick him to exposing bank account.

9. **Data Breach** – It is the incident in which information is accessed without permission.

10. **Crypto jacking** - It is the unlawful exercise of computing resources to extract crypto currencies

**Increased online financial frauds:** The Committee noted that there has been a significant increase in the number of cases and amount of money lost in cybercrime. The number of cybercrime complaints move – up from 9.7 lakhs in 2022 to 11.5 lakhs in 2023. Financial frauds are about 60% of the total complaints. Financial frauds worth Rs 5,574 crore were reported between January and October 2023, significantly higher than 2022 (Rs 2,296 crore in full year). Types of financial frauds include customer care number frauds, KYC - based frauds, and Aadhaar Enabled Payment Systems (AEPS) based frauds.

**Recovery of money:** The Committee noted that the amount of money recovered and returned to customers was very low (10.4% between 2021 and 2022).

**Region specific crimes:** The Ministry of Home Affairs submitted that a greater part of the cyber frauds originated from two locations: Mewat region in Rajasthan, Uttar Pradesh, Haryana, and Jamtara in Bihar and Jharkhand. The Committee noticed that a bulky number of micro - ATMs existed in these areas, leading to siphoning off money.

**Cyber Security –**

**CERT Advisory for Mobile banking malware** – Computer Emergency Response Team (CERT) is a group of information security experts accountable for the security against, detection of and reaction to an organization's cyber security incidents.

Download and use antimalware protection for the mobile phone or tablet.

Keep the Banking App software up to date: Using the latest version of software allows receiving important steadiness and security fixes timely.

Use security software: Applications for detecting and removing threats, including firewalls, virus and malware detection and intrusion detection systems, mobile security solutions should be installed and activated.

Reputed applications should only be

download onto the smart phone from the market after look at the developer's name, reviews and star ratings and check the permissions that the application requests and ensuring that the requests match the features provided by that application.

#### **CERT Advisory for Phishing/Smishing/Vishing Attac -**

Emails or text messages asking the user to confirm or provide personal information (Debit/Credit/ATM pin, CVV, expiry date, passwords) ignored

SSL (Secure Sockets Layer) and TLS (Transport Layer Security) should be adequately implemented in mobile banking apps thus helping to prevent phishing and man in the middle attacks.

#### **Best Practices for Users to remain safe –**

Enable Passwords On Devices: Strong passwords should be enabled on the users phones, tablets, and other mobile devices before mobile banking apps can be used. additional layers of security inherently provided by these devices should be used.

The user should report the loss of mobile phone to the bank for them to disable the user's IPIN and his access to the bank's account through Mobile Banking app.

Bank account number or IPIN should not be stored on the user's mobile phone

#### **Findings of the Study –**

1. There are innovative digital payment system launched by govt. like **USSD** - service include, interbank account to account fund transfer, balance enquiry, mini statement besides host of other services, **POS** - retailers consider to be the area where a customer completes a transaction, such as a checkout counter and **Micro ATM** - The platform will facilitate Business Correspondents (who could be a local kirana shop owner and will act as 'micro ATM') to conduct immediate transactions.

2. Government has been take plan for the awareness and growth of digital payment sys-

tem in India through **DIGISHALA - TV CHANNEL, COMMON** service center (CSCs), **VITTIYA SAKSHARTA ABHIYAN.**

3. Digital payment transactions volume increased from 2,071 crore in FY 2017-18 to 18,737 crore in FY 2023 -24 at Compounded Annual Growth Rate (CAGR) of 44%.

4. It is noticed that cybercrime has evolved swiftly and while advances in cybersecurity continue to happen, it is the constant conflict between overworked, understaffed security departments and threat actors.

5. Vishing (seek personal information of customer through a phone call). is the very repeated cyber crime in India. Additionally, making use of electronic signature, password or any other unique identification feature of person

6. The number of cybercrime complaints increase from 9.7 lakhs in 2022 to 11.5 lakhs in 2023, Financial frauds worth Rs 5,574 crore were reported between January and October 2023, notably higher than 2022 (Rs 2,296 crore in full year).

7. CERT has advised for Mobile banking malware – use antimalware security mobile, use security software, update banking app software, emails or text messages should be ignored, bank account number or IPIN should not be stored on the user's mobile phone.

**Conclusion –** Digital payment is the need of time. A rapid increase in the adoption of smart phones and net access lead to the platform for growth of digital payment system. It is convenient for proceeding payment, save money and investment. Common man can make transaction at any time. It is helpful for each and every aspect of society. R.B.I announced many significant technological changes in the India's digital payment system in 2024, to improve the functioning of payment and settlement system. R.B.I introduced key payment and settlement system of innovations -1. Increasing adoption of UPI 2. Expanding scope of Bharat bill payment system 3. Additional authentication for digital transac-

tion 4. Pre - sanctioned credit lines through UPI  
 5. Payment vision 2025. The future of digital payments in India looks bright with the expected growth in number of internet users and commerce market size.

Online fraud has been increased caused by exponential increase in digital payment brought about by our daily integration of technology. Many customers have vanished their hard earned money to these scammers. E – Commerce loses due to online payment fraud may be to rise by 131% from 2022 to 2027.

#### Suggestions –

Digital payment should integrate into many banks as far as possible

Explain to customers how digital payments are much more secure than traditional transactions.

We can improve the flow and work with credit card companies on secure synergy with an even more efficient method to pay.

We must lower the cost of digital transactions

Uninstall needless programs or software

Do not install or use pirated copies of software/ applications under any conditions. These may have malware.

Always use different passwords for different accounts, make sure password is strong.

Verify the name of “Payee” or QR code before going on with the payment

Sharing OTP may result in not permitted debits

Verify Internet Banking URLs received in SMS/Email before entering your credentials

Provide incentives for merchants to adopt digital payment methods

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## Satisfaction of People while using UPI Apps in Kundal Village

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### Abstract

'Unified Payments Interface' (UPI) is a system that powers multiple bank accounts into a single mobile application, merging several banking features, seamless fund routing & merchant payments into one hood. Various criteria about an ideal payments system was bought out by the RBI in its vision for a future payment system dreaming a digital transaction economy. From this angle, a remarkable future of the UPI is that it satisfies several criteria put forwarded by RBI payment system vision of safe, efficient, interoperable, authorized, accessible, inclusive and compliant with international standards. Due to demonetization and Corona pandemic, majority of the people are using cashless transactions. Now, in rural area, people are always using digital technologies in a few manners. Researchers have focused that how UPI's is being used by consumers. The consumer behavior is changing because of new digital technology, fashions, life styles etc. However, changing consumer behavior is affecting rural areas also. The researchers have collected required information and data from consumers in Kundal village. The primary data is collected through questionnaire, discussion, interviews, observation and necessary field work. UPI has made digital transaction for individuals as easy as sending money.

This will bring enormous efficiency in the system and help India become a truly cashless economy.

**Keywords:** UPI Apps, satisfaction, rural area, digital technology, cashless India

### 1. Introduction:

According to the NPCI, 'Unified Payments Interface' (UPI) is a system that powers multiple bank accounts into a single mobile application, merging several banking features, seamless fund routing & merchant payments into one hood. UPI's overall importance came from the intense desire and effort made by the RBI and the Government to create a cost effective, simple and safe digital payments system that will be used for the large population of the country. The RBI along with the NPCI has made commendable efforts to spread digital payments culture. According to the RBI, a digital payments platform should be simple, safe and efficient while carrying out payments. Various criteria about an ideal payments system was bought out by the RBI in its vision for a future payment system dreaming a digital transaction economy. From this angle, a remarkable future of the UPI is that it satisfies several criteria put forwarded by RBI payment system vision of safe, efficient, interoperable, authorized, accessible, inclusive and compliant with international standards.

Due to demonetization and Corona pandemic, majority of the people are using cashless transactions. Now, in rural area, people are always using digital technologies in a few manners. Researchers have focused that how UPI's is being used by consumers. The consumer behavior is changing because of new digital technology, fashions, life styles etc. However, changing consumer behavior is affecting rural areas also.

### 2. Objectives:

- 1) To know socio-economic background of the people in the study area.
- 2) To understand the Satisfaction of using UPI Apps in Kundal village.

### 3. Research Methodology:

#### 3.1 Primary data:

The researchers have collected required information and data from consumers in Kundal

village. The primary data is collected through questionnaire, discussion, interviews, observation and necessary field work.

### 3.2 Secondary data:

The researchers have collected necessary information from books, M. Phil and Ph.D. research works, magazines, internet, different websites, Daily newspapers, articles and government publications etc.

### 4. Sampling:

Simple random sampling and snowball random sampling methods are used for selecting the sample respondents. Researchers have taken 157 respondents for study.

### 5. Data analysis and interpretation:

Table No. 5.1 Showing the gender of the respondents

| Sr. No | Gender | Frequency | Percentage |
|--------|--------|-----------|------------|
| 1      | Male   | 92        | 58         |
| 2      | Female | 65        | 42         |
| Total  |        | 157       | 100        |

(Source: Field Survey)

Table No. 5.1 shows the gender of the respondents. It is clearly shows that majority (58%) of the male persons are using UPI Apps in Kundal Village. There is male dominance culture in rural areas. So, male are frequently purchased the needy goods from the markets. So, they are using UPI Apps in rural areas. The female are purchased the goods in the weekly market. So, they are not very much using UPI Apps in the sample study area.

Table No. 5.2 Showing the age of the respondents

| Sr. No. | Age group (Years) | Frequency | Percentage |
|---------|-------------------|-----------|------------|
| 1       | 19 - 25           | 100       | 64         |
| 2       | 26 - 35           | 43        | 27         |
| 3       | 36 - 45           | 06        | 04         |
| 4       | 46 - 55           | 05        | 03         |
| 5       | More then 55      | 03        | 02         |
| Total   |                   | 157       | 100        |

(Source: Field Survey)

Table No. 5.2 shows the age of the respondents. The age group of between 19-25

years has mostly (64%) using UPI Apps in the sample area. Majority the age between 19 – 25 years are bachelors in the rural areas. They are mostly dependent upon their parents. So, they are not matured about the expenses. So, they are expended their money for unnecessary things. They are not worried to their income. That's why they are mostly using UPI Apps in the rural area. Only 2% of the consumers whose age is more than 55 years are using UPI Apps in the sample study area.

Table No. 5.3 Showing the educational status of the respondents

| Sr. No. | Education         | Frequency | Percentage |
|---------|-------------------|-----------|------------|
| 1       | Up to SSC         | 05        | 03         |
| 2       | SSC               | 24        | 15         |
| 3       | HSC               | 44        | 28         |
| 4       | Graduation        | 61        | 39         |
| 5       | Post - Graduation | 17        | 11         |
| 6       | Others            | 06        | 04         |
| Total   |                   | 157       | 100        |

(Source: Field Survey)

Table No. 5.3 shows the educational status of the respondents. Majority 61 (39%) respondents have completed their traditional graduation degree. It includes Arts, Commerce and Science and in that majority there are Arts graduates in the sample study area. There is less awareness about the education in the rural areas. The main occupation is farming in the rural areas. But near about 50% of the consumers are less than graduates. They are also using UPI Apps for the purchasing the goods. It means that there is no limitation of education of using UPI Apps in the sample area. Researchers observed that those people who are less educated are also using UPI Apps in the rural areas. They are using QR codes for payments. Table No. 5.4 Showing occupation of the respondents

| Sr. No. | Occupation     | Frequency | Percentage |
|---------|----------------|-----------|------------|
| 1       | Student        | 61        | 39         |
| 2       | Govt. employee | 13        | 08         |
| 3       | Pvt. employee  | 14        | 09         |
| 4       | Business       | 09        | 06         |
| 5       | Farmer         | 42        | 27         |
| 6       | House wife     | 13        | 08         |
| 7       | Retired Person | 05        | 03         |
| Total   |                | 157       | 100        |

(Source: Field Survey)

Table No. 5.4 shows the occupational status of the respondents. Majority 61 (39%) of the respondents are student. Then 27% of the respondents are farmer and 17% respondents are Govt. and private employees. It is clearly stated that students are the major respondents in the sample area. The correlation of age and occupation is the same. The percentage of the age group is high (64%) between 19 – 25 years. Researchers have observed that the students are used UPI Apps very fluently as compare to others because they are next generation. They are very much knowing about the media than others. So, they are using UPI Apps smoothly. Farmers are also using UPI Apps in the sample study area. They told that they are using UPI Apps while they are purchasing the farming utilities and also they are using UPI Apps while they sent to money to others.

Table No. 5.5 Showing annual income of the respondents

| Sr. No. | Annual Income (Rs.) | Frequency | Percentage |
|---------|---------------------|-----------|------------|
| 1       | Less than 50,000    | 44        | 28         |
| 2       | 50,000- 100,000     | 82        | 52         |
| 3       | 100,001- 200,000    | 17        | 11         |
| 4       | 200,001- 300,000    | 10        | 06         |
| 5       | 300,001- 400,000    | 04        | 03         |
| Total   |                     | 157       | 100        |

(Source: Field Survey)

Table No. 5.5 shows the annual income of the respondents of the sample study area. 80% (28+ 52) of the respondents' annual income is less than 100,000. Only 3% of the respondents' annual income is Rs. 300,001- 400,000. Researchers have observed that the majority of the respondents' are students and farmers. Students are told that they are also belonging to the farmers' family. They are cultivating sugarcane in their farm. The income of farming is low as compare to others and also the income is not constant. Business persons also told that the income of their business is also low. So, the frequency of the annual income is not high. Only salaried people have earned their income is

steadily and their annual income is more than the farmers' and business persons.

Table No. 5.6 Showing using UPI Apps of the respondents

| Sr. No. | Using UPI Apps | Frequency | Percentage |
|---------|----------------|-----------|------------|
| 1.      | Yes            | 151       | 96         |
| 2.      | No             | 056       | 04         |
| Total   |                | 157       | 100        |

(Source: Field Survey)

Table No. 5.6 shows using of UPI Apps of the respondents. 96% of the respondents are using UPI Apps in the sample study area. Only 4% of the respondents are not using UPI Apps in the sample area. It means that there is a tendency of the people for using UPI Apps in the rural area. Researchers have observed that all students, business person and employees are using UPI Apps and some of farmers, retired person and house wives have not using UPI Apps in the sample study area.

Table No. 5.7 Which UPI Apps using by the respondents

| Sr. No. | Name of the UPI App | Frequency | Percentage |
|---------|---------------------|-----------|------------|
| 1.      | Google pay          | 57        | 38         |
| 2.      | Phone pay           | 68        | 45         |
| 3.      | Paytm               | 06        | 04         |
| 4.      | Bhim pay            | 05        | 03         |
| 5.      | Amazon pay          | 03        | 02         |
| 6.      | Others              | 12        | 08         |
| Total   |                     | 151       | 100        |

(Source: Field Survey)

Table No. 5.7 shows which UPI Apps using by the respondents in the sample study area. Majority 68 (45%) respondents are using 'Phonepay' UPI App and the next 38% of the respondents are using 'Googlepay' Apps for the online money transactions. There are very famous and friendly using UPI Apps in the rural area. Researchers have observed that some of the respondents are using more than one UPI App. But they have given preference on the respected apps. Some of the respondents are using Whatsapp for payments or transfer the money.

Table No. 5.7 Frequency of UPI Apps using in a

week

| Sr. No. | Freq. of the UPI App | Frequency | Percentage |
|---------|----------------------|-----------|------------|
| 1.      | 0- 2                 | 25        | 17         |
| 2.      | 3- 5                 | 32        | 21         |
| 3.      | 5- 10                | 09        | 06         |
| 5.      | More than 10         | 05        | 03         |
| 6.      | Occasionally         | 80        | 53         |
| Total   |                      | 151       | 100        |

(Source: Field Survey)

Table No. 5.7 shows the frequency of using UPI Apps in a week by the respondents. It is clearly show that majority 80 (53%) of the respondents are occasionally using UPI Apps in rural area. They told that they are using UPI Apps as and when required. They also told that they are caring cash for purchasing the goods. They also told that when they are not caring the cash and immediately purchasing the goods then and then only they are preferred the UPI Apps. But on the other hands, the students and business person are frequently using UPI Apps in the sample study area. Generally, some respondents are told that they are using UPI Apps while they are purchasing petrol and booking gas calendar.

Table No. 5.8 How long (Period) of using UPI Apps

| Sr. No. | Period (year)      | Frequency | Percentage |
|---------|--------------------|-----------|------------|
| 1.      | Less than one year | 12        | 08         |
| 2.      | 1- 2 years         | 33        | 22         |
| 3.      | 2- 3 years         | 88        | 58         |
| 5.      | 3- 5 years         | 08        | 05         |
| 6.      | More than 5 years  | 10        | 07         |
| Total   |                    | 151       | 100        |

(Source: Field Survey)

Table No. 5.8 shows the how long the respondents are using UPI Apps in the sample study area. Majority 88 (58%) of the respondents are using UPI Apps 2-3 years. Then 22% of the respondents are using UPI Apps in one to two years. Only 7% of the respondents are using UPI Apps on more than 5 years. It is clearly shown that the main reason of using UPI Apps is Corona Pandemic. After Corona many of the people

are using UPI Apps in rural areas. Perhaps, it is not a fashion but it is a need of using UPI Apps. Researchers have Observed that the young generation is mostly using UPI Apps in the sample study area.

Table No. 5.7 Purpose of using UPI Apps

| Sr. No. | Purpose                    | Frequency | Percentage |
|---------|----------------------------|-----------|------------|
| 1.      | To purchase Grocery items  | 26        | 17         |
| 2.      | To pay electricity bill    | 19        | 13         |
| 3.      | To do mobile recharge      | 35        | 23         |
| 4.      | For business transactions  | 17        | 11         |
| 5.      | For household items        | 12        | 08         |
| 6.      | To purchase personal items | 15        | 10         |
| 7.      | To Pay hotel bills         | 22        | 15         |
| 8.      | Others                     | 05        | 03         |
| Total   |                            | 151       | 100        |

(Source: Field Survey)

Table No. 5.7 shows the purposes of using UPI Apps by the respondents. Majority 35 (23%) of the respondents are using UPI Apps for mobile recharge. 17% of the respondents told that they are using UPI Apps for purchasing grocery items. 15% of the respondents are using UPI Apps for payment of hotel bills. Only 3% of the respondents are using UPI Apps for other purposes. Researchers observed that they are using UPI Apps for mobile recharge of other person, money transfer, to check the bank balance and for purchasing petrol. It is clearly interpreted that majority of the respondents are using UPI Apps for mobile recharge. There are very few mobile shops in the rural areas as well as there is a tendency for mobile recharge of personal phones. The respondents are told that they are recharging their mobile phones through their personal mobiles because they get various cash back offers and other offers also. Researchers observed that people are purchased grocery items frequently used. They also observed that people in the rural areas are purchased grocery items as and when required.

Table No. 5.8 Satisfaction towards using UPI Apps

| Sr. No. | Satisfaction towards using UPI Apps | Frequency | Percentage |
|---------|-------------------------------------|-----------|------------|
| 1.      | Yes                                 | 134       | 89         |
| 2.      | No                                  | 017       | 11         |
| Total   |                                     | 151       | 100        |

(Source: Field Survey)

Table No. 5.8 shows satisfaction towards UPI Apps. Majority 134 (89%) of the respondents are satisfied for using UPI Apps and only 11% of the respondents are dissatisfied for using UPI Apps in the sample study area. It is clearly shown that digital technology and UPI Apps are very famous in the rural area. Researchers observed that some of the respondents are not satisfied for using UPI Apps in the sample study area. They told that they are not aware about using UPI Apps. Researchers observed that there is a fear in mind for using UPI Apps in some respondents. So, they are not satisfied for using UPI Apps.

Table No. 5.9 Problems faced while using UPI Apps

| Sr. No. | Problems             | Frequency | Percentage |
|---------|----------------------|-----------|------------|
| 1.      | Network problem      | 47        | 31         |
| 2.      | Pending transactions | 24        | 16         |
| 3.      | Security Problem     | 67        | 44         |
| 4.      | Others               | 13        | 09         |
| Total   |                      | 151       | 100        |

(Source: Field Survey)

Table No. 5.9 shows problems faced while using UPI Apps. Majority 67 (44%) of the respondents told that they are faced security problem. 31% of the respondents are told that they are faced network problem. 16% of the respondents are feared about pending transactions. Only 9% respondents are told that they faced other problems. They told that they are heisted for using UPI Apps. But they are using UPI Apps in few manners. Researchers observed that people in the rural areas are very much fears for using UPI Apps because security reasons. They are not faithful for using UPI Apps. There is a huge networking problem in the rural area.

## 6. Conclusion:

The above study on satisfactions of using UPI apps is a grand step towards making the cashless payments faster, smoother and easier. It is said that the launch of UPI will prove to be a milestone in the transformation of modern India. It is all set to become an efficient alternative to mobile wallets. The customers are

satisfied with the UPI apps and digital payments. They have to improve their satisfaction level through fund transfer. The study also reveals that users of UPI have a strong positive Satisfaction towards technology used in banking which is reflected in there adoption and usage of the same whereas non users clearly exhibited their disinterest and ignorance in using various technology. UPI has made digital transaction for individuals as easy as sending money. Service is available 24\*7 not like RTGS or NEFT which don't work on holidays or during non-banking hours. This will bring enormous efficiency in the system and help India become a truly cashless economy.

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## Impact of Digital Payments on Rural Markets

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### 1.1 Abstract

The adoption of digital payments in rural markets has significantly transformed the financial landscape by enhancing economic growth, transaction efficiency, and financial inclusion. With expanding mobile connectivity, government initiatives, and a shift towards cashless transactions, rural communities are gradually integrating digital payments into their daily lives. This study, based on primary data from structured surveys, examines the impact of digital payments on rural consumers, small business owners, and merchants. Findings reveal key demographic factors influencing adoption, including age, education, and occupation. The study also explores preferred payment methods like UPI, mobile wallets, debit/credit cards, and Aadhaar-enabled systems, along with the motivations for digital payment adoption, such as convenience, security, and government subsidies.

Despite the benefits, barriers like poor internet connectivity, low digital literacy, security concerns, and resistance to change limit widespread adoption. Government programs like Digital India and PMJDY have boosted digital transactions, but their effectiveness varies across rural regions. Technological advancements like AI, blockchain, and biometrics offer solutions to these challenges. In conclusion, digital payments have the potential to revolutionize rural markets, but a collaborative effort

among policymakers, financial institutions, and technology providers is needed to maximize their impact and ensure broader financial inclusion.

**Keywords:** Digital Payments, Rural Markets, Financial Inclusion, Digital Transactions, Economic Growth, Government Policies, Digital Literacy, Mobile Transactions, FinTech, UPI, Cashless Economy, Digital Financial Services, Transaction Security, Payment Barriers, Technological Advancements.

### 1.2 Introduction

Digital payments have revolutionized the rural economy, offering a seamless, efficient, and secure mode of financial transactions. The rapid expansion of smartphone penetration and internet connectivity has significantly influenced financial behaviour, enabling rural communities to shift from cash-based transactions to digital platforms. Over the past decade, government initiatives such as Digital India, Pradhan Mantri Jan Dhan Yojana (PMJDY), and post-demonetization efforts have accelerated the adoption of digital payments. The introduction of Unified Payments Interface (UPI), mobile wallets, Aadhaar-enabled Payment Systems (AEPS), and Digibanking services has played a crucial role in financial inclusion, bringing millions of previously unbanked individuals into the formal financial system.

Despite these advancements, rural India still faces major challenges in adopting digital payments on a large scale. Key barriers include limited internet connectivity, digital illiteracy, cybersecurity concerns, lack of trust in digital transactions, and strong cash dependency. While urban areas have rapidly embraced digital transactions, rural communities struggle with inconsistent digital infrastructure and a lack of awareness about financial tools.

This study aims to analyse the real impact of digital payments in rural markets based on primary data from 110 respondents. It examines adoption patterns, challenges, and key trends while exploring the role of government

policies and technological innovations like AI and blockchain. The findings offer insights into overcoming barriers, ensuring broader financial inclusion, and guiding policymakers, financial institutions, and technology providers in designing strategies for a seamless digital financial transition in rural India.

### 1.3 Objectives of the Study

The primary objectives of this study are:

- To analyse the demographic profile of rural digital payment users.

- To examine the frequency and preferred methods of digital transactions in rural areas.

- To evaluate the impact of digital payments on rural businesses and agricultural transactions.

- To identify major barriers faced by rural users in adopting digital payments.

- To explore government initiatives and policy measures promoting digital payments.

- To discuss technological advancements that can enhance digital transactions in rural markets.

- To suggest strategies for improving digital payment penetration and efficiency in rural areas.

### 1.4 Research Methodology

#### Type of Study

This study is based on primary data and follows a quantitative research approach to analyse the adoption and impact of digital payments in rural markets. The research employs a descriptive research method, aiming to understand user behaviour, advantages, challenges, and perceptions regarding digital transactions in rural areas.

#### Data Collection Method

To ensure a structured and systematic approach, data was collected through a survey-based method using Google Forms. A well-designed questionnaire was created, covering key aspects such as:

- Demographic details (age, gender, occupation, and education level).

- Awareness and usage of digital payment methods.

- Preferred digital payment platforms (UPI, mobile wallets, debit/credit cards, etc.).

#### Challenges faced in adopting digital pay-

ments.

- Impact on purchasing behaviour and overall convenience.

The questionnaire included both closed-ended and Likert scale-based questions to ensure precise responses and statistical analysis. The survey was distributed online and offline in rural areas to ensure diverse participation.

#### Sample Size and Population

- A total of 110 respondents from various rural markets were surveyed. The sample included individuals from different:

- Age groups (young adults, middle-aged, and elderly).

- Occupations (farmers, small business owners, daily wage workers, and salaried professionals).

- Educational backgrounds (illiterate, primary education, secondary education, and higher education).

- This diverse sample helped in obtaining a holistic view of digital payment adoption in rural areas.

#### Data Representation & Analysis

The collected data was analysed using statistical tools and graphical representations such as:

- Pie charts and bar graphs to showcase demographic distribution and payment preferences.

- Descriptive statistics for identifying key trends and adoption patterns.

- Comparative analysis of different demographic groups and their inclination toward digital payments.

The insights drawn from this study help in understanding the penetration, challenges, and future potential of digital payments in rural markets.

### 1.5 Literature Review

#### Digital Payments in Rural Economies-

Existing literature on digital payments underscores their transformative impact on rural economies, particularly in advancing financial inclusion, enhancing transactional efficiency, and reducing dependency on cash-based economies. Studies have shown that digital payment systems provide secure, transparent, and convenient alternatives to traditional financial transactions, enabling even the unbanked

population to participate in the formal financial system.

A significant body of research highlights how mobile penetration and fintech innovations have accelerated the shift toward digital transactions, particularly in emerging economies. For instance, a **World Bank report** on financial inclusion suggests that access to mobile banking and digital wallets has substantially increased participation in the financial sector in rural regions. Furthermore, research in developing countries shows that areas with higher smartphone penetration rates have witnessed a more rapid shift toward **cashless economies**, driven by the affordability and ease of mobile payment solutions.

However, despite these advantages, researchers have pointed out that digital payment adoption varies widely across different socio-economic and geographic contexts. While urban populations readily embrace digital transactions, rural communities often lag due to infrastructural, educational, and economic constraints. This study builds on existing research to assess the adoption of digital payments in rural India and the key factors influencing their growth.

### National & Global Trends

India's Digital Payment Growth

The Indian government has taken several initiatives to promote digital transactions in rural areas. Key programs such as:

Digital India Initiative – Launched to enhance digital infrastructure and connectivity.

Pradhan Mantri Jan Dhan Yojana (PMJDY) – A scheme to provide bank accounts and financial services to the unbanked population.

BHIM UPI and Aadhaar-linked payments – Enabling seamless digital transactions across regions.

According to a report by the Reserve Bank of India (RBI), the number of digital transactions in rural India has steadily increased, with UPI emerging as the most widely used platform. However, the adoption rate still lags be-

hind urban areas, primarily due to infrastructural and digital literacy challenges.

### Global Perspectives on Digital Payment Adoption

Globally, many countries have successfully implemented fintech-driven digital payment systems in rural areas:

**China:** Platforms like WeChat Pay and Alipay have revolutionized rural commerce, enabling small businesses and farmers to accept digital payments.

**Kenya:** The introduction of M-Pesa has significantly boosted financial inclusion, allowing users to transfer money and make payments using mobile phones, even in remote villages.

**Brazil:** The Pix instant payment system has seen rapid adoption, reducing reliance on cash transactions in underdeveloped regions.

These global success stories illustrate the potential of mobile-based digital payment systems in overcoming financial barriers and fostering inclusive economic growth. Comparing these trends with India's rural payment ecosystem can provide insights into best practices and policy recommendations.

### Infrastructure Limitations –

Limited internet connectivity, inconsistent electricity supply, and inadequate banking infrastructure restrict the widespread adoption of digital payments in rural areas.

**Transaction Costs and Affordability –** Some research suggests that transaction fees, smartphone costs, and additional service charges discourage low-income populations from fully adopting digital transactions.

This study builds upon these existing findings to examine whether these barriers persist in rural India today and to what extent government and private-sector interventions have mitigated these challenges. By analysing real-time data from rural markets, this research aims to provide actionable insights for policymakers, fintech companies, and financial institutions to further promote digital financial inclusion.

### 1.6 Findings and Analysis

## Comprehensive Findings and Analysis of Digital Payments in Rural Markets

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                        |
| FREQUENCY OF DIGITAL PAYMENTS               | <ol style="list-style-type: none"> <li>1) Daily users (45%) - High dependency on digital payments for routine time expenses.</li> <li>2) Weekly users (32%) - Moderate engagement not, using it primarily for specific transaction S.</li> <li>3) Occasional users (15%) - Limited adoption, using digital payments only when necessary.</li> <li>4) Rare users (8%)</li> <li>5) Face digital infrastructure urea or trust issues.</li> </ol> | <ol style="list-style-type: none"> <li>1) Daily users include shopkeeper Rs, salaried profession ales, and tech-savvy youth.</li> <li>2) Weekly users include small business owners and rural consumers who make periodic transactions. Rare users belong mostly to older generations and less-educated groups, showing resistance to digital transactions.</li> </ol> |
| IMPACT ON BUSINESS                          | <ol style="list-style-type: none"> <li>1) 41% of small business owners</li> <li>2) reported an increase in sales due to digital payments. - Benefits include faster transaction S, customer convenience e, and reduced cash handling</li> </ol>                                                                                                                                                                                               | <ol style="list-style-type: none"> <li>1) Digital payments help businesses reach more customers by providing flexible payment options. Cashless transaction s improves transparent cy and financial tracking.</li> <li>2) Digital payments reduce dependency y on cash but require better financial literacy to maximize benefits.</li> </ol>                          |
| BARRIERS TO DIGITAL PAYMENT ADOPTION        | <ol style="list-style-type: none"> <li>1) Limited internet access (41%) is the biggest challenge.</li> <li>2) Lack of digital literacy (28%) prevents widespread adoption.</li> <li>3) Security concerns (18%) due to fraud risks and transaction fair' High transaction fees (13%) discourage small businesses from adopting digital payments</li> </ol>                                                                                     | <ol style="list-style-type: none"> <li>1) The rural digital divide continues to be a challenge, affecting internet penetration and financial accessibility y. Cybersecure it concerns deter older and less educated users from adopting digital transaction S. Transaction fees make small businesses hesitant to fully shift to digital transactions</li> </ol>       |
| OVERALL ECONOMIC IMPACT                     | <ol style="list-style-type: none"> <li>1) 73% of respondent s believe digital payments positively impact rural economic activity. Benefits include faster transaction s, better financial management not, and increased business revenue</li> </ol>                                                                                                                                                                                           | <ol style="list-style-type: none"> <li>1) Digital transaction S contribute to financial inclusion, reducing cash dependency y.</li> <li>2) Improved payment infrastructure urea promotes economic stability in rural markets.</li> <li>3) Increased usage of digital payments can drive local business growth and facilitate access to banking services.</li> </ol>    |
| FUTURE SCOPE & TECHNOLOGY CALL ADVANCEMENTS | <ol style="list-style-type: none"> <li>1) AI &amp; Machine Learning:</li> <li>2) Enhances fraud detection and security in digital payments.</li> <li>3) Blockchain Technology y: Ensures secure and transparent transaction S.</li> </ol>                                                                                                                                                                                                     | <ol style="list-style-type: none"> <li>1) AI-based fraud detection can increase trust in digital transaction S. Blockchain can provide decentralized security, reducing fraud risks.</li> <li>2) Biometric authentication simplifies digital payments for elderly and less-educate d users, improving adoption</li> </ol>                                              |

The study's findings are based on primary data collected from 110 respondents in rural markets. The analysis focuses on demographic patterns, payment preferences, usage frequency, barriers, and economic impact, providing a comprehensive view of the digital transaction landscape in rural areas.

### 1.7 Conclusion

The study underscores the increasing adoption of digital payments in rural markets, fueled by government initiatives, smartphone penetration, and changing financial behaviours. UPI transactions are the most preferred payment method, particularly among middle-aged individuals and small business owners. The shift to digital transactions has facilitated faster payments, enhanced financial inclusion, and boosted business sales, showcasing their transformative potential in rural economies. However, key challenges such as limited internet access, digital illiteracy, security concerns, and high transaction fees continue to hinder widespread adoption.

To overcome these barriers, the study recommends expanding rural broadband, implementing localized digital literacy programs, strengthening fraud protection measures, and reducing transaction costs for small businesses. With 73% of respondents recognizing the positive economic impact of digital payments, it is clear that cashless transactions are becoming an integral part of rural financial systems. Future advancements in AI-driven fraud detection, blockchain technology, and biometric authentication can further enhance the security and accessibility of digital payments. Continued research on long-term adoption trends and global best practices will be essential to fostering a truly cashless and inclusive rural economy.

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## IMPACT OF DIGITAL PAYMENT ON RURAL MARKET

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### ABSTRACT

Digital payment systems have significantly transformed rural markets, reducing cash dependency and increasing financial inclusion. With the rapid expansion of smart phone usage, mobile banking, and government initiatives like Digital India and UPI, rural consumers and businesses are gradually shifting to cashless transactions. However, challenges such as low digital literacy, inadequate infrastructure, and security concerns persist. This study aims to examine the impact of digital payments on rural markets, focusing on benefits, challenges, and strategies for improvement. A detailed review of literature, theoretical framework, and research methodology are used to analyze the adoption and effectiveness of digital payment systems in rural areas.

### 1. INTRODUCTION

The Indian economy is undergoing a digital transformation, and digital payments play a vital role in modernizing financial transactions. Rural markets, which have traditionally relied on cash transactions, are now gradually adopting digital payment systems due to improved technology, better internet penetration, and government-led financial inclusion initiatives.

The introduction of UPI, Aadhaar-enabled payment systems, and mobile banking has accelerated digital transactions in rural areas. However, the transition is not without challenges. Limited digital literacy, lack of trust in

online transactions, and unreliable internet infrastructure have slowed adoption rates. To ensure the success of digital payments in rural markets, it is essential to address these barriers and promote digital literacy.

This research focuses on the impact of digital payments on rural markets, highlighting both the benefits and the challenges. The study also provides suggestions to improve adoption rates and ensure sustainable digital financial inclusion.

## 2. OBJECTIVES OF THE STUDY

1. To study the impact of digital payments on rural markets.
2. To understand the challenges faced by rural people in adopting digital payments.
3. To examine the role of government initiatives in promoting digital payments.
4. To suggest measures for expanding digital payment systems in rural areas.

## 3. REVIEW OF LITERATURE

Several studies have explored the impact of digital payments on rural economies:

Shukla & Sharma (2020) – Their study highlights how digital payments have increased financial inclusion in rural India, particularly through mobile banking and UPI transactions. However, they also note that digital literacy remains a significant challenge.

Kumar et al. (2021) – This research focuses on the role of fintech in rural economies, emphasizing that mobile payment solutions have made transactions faster and more efficient but require better network infrastructure.

RBI Report (2022) – The report suggests that government initiatives like Digital India and PM Jan Dhan Yojana have played a crucial role in pushing digital transactions in rural areas. However, more awareness programs are needed.

Bansal & Gupta (2023) – Their study points out that while digital payments have reduced transaction costs, security concerns and cyber fraud are key barriers to adoption.

## 4. RESEARCH METHODOLOGY

This research follows a conceptual approach and relies on secondary data collected from various sources, including:

Research papers and journals on digital payments in rural India.

Government reports and policy documents on financial inclusion.

Case studies of rural businesses adopting digital payment systems.

News articles and industry reports on trends in digital transactions.

The study uses qualitative analysis, reviewing past findings and providing new insights based on existing literature.

## 5. THEORETICAL FRAMEWORK

### 5.1 IMPACT OF DIGITAL PAYMENTS ON RURAL MARKETS

Digital payment systems have significantly influenced rural markets by making financial transactions more efficient and accessible. According to the Reserve Bank of India (RBI) report (2023), digital payments in rural India grew by 68% over the last five years. The adoption of UPI transactions in rural areas increased from 10% in 2019 to 47% in 2023.

**Financial Inclusion:** Digital payments have enabled individuals without traditional banking access to participate in the formal economy. As per NPCI, 78% of rural customers now use digital payment services linked to their Jan Dhan accounts.

**Economic Growth:** Small businesses in rural areas have seen an increase in sales due to the ease of digital transactions. The digital economy has contributed to a 15% increase in rural GDP growth as per the Indian Economic Survey (2023).

**Convenience & Transparency:** Digital payments have reduced the need for cash handling, leading to faster transactions and reduced fraud risks in business dealings.

### 5.2 CHALLENGES FACED BY RURAL PEOPLE IN ADOPTING DIGITAL PAYMENTS

Despite the growth of digital payments, several obstacles remain in rural India:

**Low Digital Literacy:** According to the Ministry of Electronics and IT (2022), only 32% of the rural population is digitally literate, making it difficult for them to trust and adopt digital payment platforms.

**Limited Internet Connectivity:** As per TRAI (2023), 40% of villages still lack reliable internet access, limiting the use of digital transactions.

**Security Concerns & Fraud:** A survey by NPCI (2023) found that 18% of rural users fear online fraud, making them hesitant to adopt digital payment methods.

**Language Barriers:** Many digital payment platforms are primarily available in English and Hindi, creating difficulties for users in non-Hindi-speaking rural areas.

### 5.3 ROLE OF GOVERNMENT INITIATIVES IN PROMOTING DIGITAL PAYMENTS

Government initiatives have played a crucial role in boosting digital transactions in rural areas. Some of the key initiatives include:

**Digital India Campaign (2015):** Over 1.5 lakh villages have been provided with broadband connectivity, promoting digital transactions.

**UPI 123Pay (2022):** Launched to enable feature phone users (without internet) to conduct digital transactions, benefiting over 40 million rural users.

**PM Jan Dhan Yojana (PMJDY):** More than 50 crore (500 million) accounts have been opened, linking rural customers to digital payment services.

**DigiDhan Abhiyan:** This scheme has trained 30 million rural citizens in using digital payment platforms.

### 6. FINDINGS

The adoption of digital payments is growing steadily in rural areas due to increased smartphone usage and internet penetration.

UPI, mobile banking, and Aadhaar-enabled payment systems are the most commonly used digital payment methods.

Lack of digital literacy and limited access to high-speed internet are major chal-

lenges.

Small traders and farmers are gradually accepting digital payments, but trust issues and fear of fraud remain concerns.

Government programs such as Digital India and PM Jan Dhan Yojana have significantly contributed to financial inclusion.

Many rural consumers still prefer cash due to a lack of familiarity with digital payment platforms.

### 7. SUGGESTIONS

**Enhance Digital Literacy:** Conduct workshops and training programs to educate rural populations on using digital payments securely.

**Improve Infrastructure:** Strengthen mobile networks and internet connectivity in remote areas.

**Encourage Small Businesses:** Provide incentives for small businesses to adopt digital payment methods.

**Increase Cyber security Awareness:** Educate users about online fraud prevention and security measures.

**Simplify Digital Payment Platforms:** Develop user-friendly interfaces with regional language support.

**Expand Government Support:** Introduce more schemes and incentives to promote digital transactions in rural areas.

### 8. CONCLUSION

Digital payments have the potential to revolutionize rural markets by promoting financial inclusion, reducing transaction costs, and increasing efficiency. While progress has been made, challenges like digital literacy, internet connectivity, and security concerns need to be addressed. Government policies, private sector initiatives, and community-driven efforts can play a crucial role in bridging the digital divide. With continued efforts, digital payments can become a key driver of economic development in rural India.

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## E-GOVERNANCE IN RURAL INDIA: UNLOCKING DEVELOPMENT THROUGH DIGITAL LITERACY

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### Abstract

The rapid advancement of digital technology has significantly transformed governance systems, making public services more accessible and efficient. However, rural India continues to face challenges in adopting e-governance due to low digital literacy levels, limited technological infrastructure, and socio-economic constraints. This study explores the role of digital literacy in enhancing e-governance adoption for rural development, using secondary data from government sources such as Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), Common Service Centres (CSCs), BharatNet Initiative, and the Open Government Data (OGD) Platform India. A descriptive and analytical approach is applied to examine the impact of digital literacy on governance accessibility and service utilization in rural areas. The findings suggest that higher digital literacy levels improve engagement with e-governance services, leading to better socio-economic development outcomes. However, challenges such as infrastructure gaps, internet accessibility, and awareness levels hinder full adoption. The study provides policy recommendations to strengthen digital literacy programs, bridge the rural-urban digital divide, and enhance the effectiveness of e-governance in rural India.

**Keywords:** Digital Literacy, E-Governance, Rural Development, Digital Divide, Pradhan Mantri

Gramin Digital Saksharta Abhiyan, Common Service Centres, BharatNet, Digital Inclusion, Public Service Accessibility, Rural India

## INTRODUCTION

The advent of digital technology has revolutionized governance by making public services more transparent, efficient, and accessible. E-governance, which refers to the use of information and communication technology (ICT) for delivering government services, plays a crucial role in enhancing administrative efficiency and citizen engagement. In India, the Digital India initiative has significantly promoted e-governance adoption, aiming to create an inclusive digital ecosystem. Various government schemes are helping to increase digital literacy. Large amounts of funding are being provided for this in rural areas. However, rural India still faces significant challenges in accessing these services due to low digital literacy, inadequate infrastructure, and socio-economic barriers. Due to digital literacy, modern technology and facilities have started being used even in rural and hilly areas, tribal areas, and underserved areas. Many things have become possible due to easy technical knowledge. Financial transactions like BHIM App, PhonePe, Internet, banking etc. have increased significantly in rural areas. Also, e-filing and paperless administration in government offices are gradually helping in digital literacy. Digital literacy is a fundamental enabler of e-governance, as it empowers citizens to navigate online platforms, avail government services, and participate in decision-making processes. Government initiatives such as Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), Common Service Centres (CSCs), and BharatNet have been introduced to bridge the digital divide and enhance rural connectivity. Despite these efforts, many rural populations struggle to utilize e-governance services effectively due to lack of awareness, poor digital infrastructure, and affordability issues. This research explores the role of digital literacy in

unlocking the potential of e-governance for rural development. It examines the impact of digital inclusion on governance accessibility, identifies existing challenges, and highlights key government initiatives aimed at promoting digital literacy in rural India. The study also provides policy recommendations to strengthen digital infrastructure and ensure equitable access to digital governance, fostering socio-economic development in rural regions.

## OBJECTIVES OF THE STUDY:

1. To analyze the impact of digital literacy on the accessibility and effectiveness of e-governance services in rural India.
2. To identify the challenges and opportunities in implementing digital literacy programs for enhancing rural governance and development.

## STATEMENT OF THE RESEARCH PROBLEM

The rapid advancement of digital technology has transformed governance systems, yet rural India continues to face challenges in accessing and utilizing e-governance services. Digital literacy plays a crucial role in enabling rural populations to effectively engage with online government services, promoting transparency, efficiency, and inclusivity. However, a significant digital divide persists due to limited access to technology, inadequate digital education, and infrastructural constraints. This gap hinders rural communities from benefiting fully from e-governance initiatives aimed at socio-economic development. Understanding the impact of digital literacy on the accessibility and effectiveness of e-governance services is essential for policy enhancement. Additionally, identifying challenges and opportunities in implementing digital literacy programs will help bridge the gap and improve governance outcomes. This research seeks to explore how digital literacy can unlock rural development by strengthening e-governance participation. Analyzing these aspects will provide insights into strategies for fostering digital inclusion in governance.

**RESEARCH HYPOTHESIS:** Higher levels of digi-

tal literacy significantly enhance the accessibility, adoption, and effectiveness of e-governance services, leading to improved rural development outcomes in India.

### 1. Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA):

Launched in 2017, PMGDISHA aims to make six crore rural households digitally literate. As of August 2021, approximately 5.01 crore beneficiaries had been enrolled, with 4.21 crore trained under the scheme.

### 2. Common Service Centres (CSCs):

CSCs are digital access points established to deliver various e-governance services to rural citizens. With over 5.5 lakh Village Level Entrepreneurs (VLEs) operating these centers, CSCs have become instrumental in promoting digital literacy and providing services like banking, insurance, and telemedicine in rural areas.

### 3. Bharat Net Initiative:

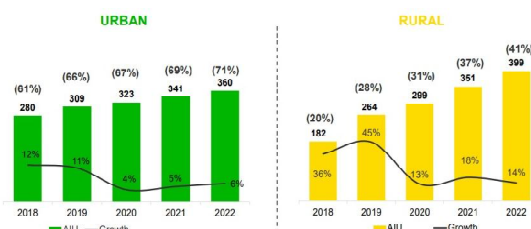
This project aims to connect all 2.5 lakh Gram Panchayats in India with high-speed broadband, facilitating improved access to e-governance services. The initiative is expected to enhance service delivery in areas such as education, healthcare, and agriculture, thereby promoting rural development.

### 4. Digital Literacy Statistics:

According to data from the Open Government Data (OGD) Platform India, there has been a notable increase in digital literacy among rural youth. The percentage of individuals aged 15-24 years with various ICT skills has risen, indicating a positive trend towards digital adoption in rural areas.

#### Active Internet Users: Urban and Rural

Rural India continues to drive Internet adoption in the country, surpassing Urban India and still growing at double the rate.



[https://www.iamai.in/sites/default/files/research/Internet%20in%20India%202022\\_Print%20version.pdf](https://www.iamai.in/sites/default/files/research/Internet%20in%20India%202022_Print%20version.pdf)

search/Internet%20in%20India%202022\_Print%20version.pdf

The above table shows the data of urban and rural internet users. From this, we can estimate the increasing number of internet users in India. The growth and development of e-governance is considered complementary to the implementation of e-governance. This will greatly assist in the implementation of various administrative and government schemes in rural India, contributing to rural development and helping to increase digital literacy.

### RESEARCH METHODOLOGY

This study adopts a secondary data analysis approach, utilizing credible government reports, databases, and policy documents to assess the role of digital literacy in enhancing e-governance for rural development in India. The research follows a descriptive and analytical design, focusing on government initiatives, digital literacy programs, and statistical data to evaluate the accessibility, adoption, and impact of e-governance services in rural areas. The data for this study is sourced from authoritative government institutions such as Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), Common Service Centres (CSCs), BharatNet Initiative, and the Open Government Data (OGD) Platform India. PMGDISHA provides information on rural digital literacy enrollment and training progress, while CSCs offer insights into the effectiveness of digital service delivery at the grassroots level. The BharatNet Initiative contributes data on rural broadband connectivity, highlighting its role in expanding digital access for governance services. Additionally, the Open Government Data Platform presents statistical reports on digital literacy among rural youth and their engagement with e-governance platforms. Further data is extracted from government reports and policy documents published by the Ministry of Electronics & Information Technology (MeitY) and the National Informatics Centre (NIC) to analyze the overall digital infrastruc-

ture supporting e-governance in rural India.

For data analysis, a descriptive approach will be used to present statistics on digital literacy rates, internet penetration, and e-governance adoption. A comparative analysis will assess the effectiveness of various government initiatives like PMGDISHA, CSCs, and BharatNet in promoting digital inclusion. Additionally, trend analysis will be conducted using historical government data to evaluate the progress of digital literacy and e-governance accessibility over the years. All data in this research is sourced from publicly available government repositories to ensure authenticity and reliability. Proper citations and acknowledgments of official sources will be maintained to uphold research integrity. The expected outcome of this study is to provide a data-driven assessment of how digital literacy influences e-governance adoption in rural India. It will highlight implementation gaps, the effectiveness of government programs, and policy recommendations to enhance rural digital inclusion.

#### FINDINGS

- **Digital Literacy and E-Governance Adoption:** While initiatives like PMGDISHA and CSCs have improved digital literacy, a significant digital divide persists, limiting effective engagement with e-governance services in rural areas.
- **Service Accessibility:** Higher digital literacy levels correlate with better utilization of e-governance services such as Aadhaar-linked benefits and digital banking. CSCs play a crucial role in bridging the gap for digitally illiterate individuals, but their reach remains insufficient in remote areas.
- **Infrastructure Challenges:** Despite the BharatNet initiative improving broadband connectivity, many rural regions still face network gaps, power shortages, and affordability issues, restricting digital access.
- **Policy and Awareness Gaps:** Limited awareness of digital literacy programs and the lack of localized content in regional languages

hinder broader adoption of e-governance services among rural populations.

#### CONCLUDING REMARKS

Digital literacy plays a transformative role in enabling e-governance adoption and fostering rural development in India. While government initiatives such as PMGDISHA, CSCs, and BharatNet have contributed to bridging the digital divide, significant challenges remain, including connectivity issues, awareness gaps, and socio-economic barriers. The study highlights that villages with better digital literacy show higher participation in e-governance services, leading to improved efficiency and transparency in government service delivery. However, a holistic approach is required to strengthen digital literacy training, enhance infrastructure, and promote localized content to ensure inclusivity. To maximize the impact of digital literacy on e-governance adoption, policymakers should expand the reach of digital literacy programs, improve rural internet infrastructure, and integrate digital education into school curriculums. Addressing these gaps will help create an inclusive digital ecosystem where rural citizens can fully participate in governance processes, thereby accelerating rural socio-economic development and digital empowerment in India.

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15

## Role of Mobile Payments in India's Economic Growth: Analysing How Mobile Wallets and UPI Have Revolutionized Digital Payments

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### Abstract:

The rapid adoption of mobile payments in India has significantly contributed to the country's economic growth, financial inclusion, and digital transformation. The introduction of mobile wallets and the Unified Payments Interface (UPI) has revolutionized the payment landscape, reducing dependency on cash and enhancing transactional efficiency. This paper explores the role of mobile payments in driving economic growth by analysing their impact on financial accessibility, small businesses, and the digital economy.

The widespread adoption of UPI, launched by the National Payments Corporation of India (NPCI) in 2016, has enabled seamless peer-to-peer and business transactions, making digital payments more accessible to millions. Mobile wallets such as Paytm, PhonePe, and Google Pay have further facilitated cashless transactions, particularly after the 2016 demonetization. These innovations have supported small businesses, micro, small, and medium enterprises (MSMEs), and the gig economy by providing secure, instant, and low-cost financial services.

Government initiatives such as Digital India and BHIM UPI have accelerated the shift

toward a cashless economy, increasing tax compliance and financial transparency. The surge in digital transactions has also boosted the e-commerce sector and improved consumer convenience. However, challenges such as cybersecurity risks, digital fraud, and the rural-urban digital divide remain key concerns.

Despite these challenges, mobile payments continue to be a driving force in India's economic formalization and technological advancement. With ongoing innovations, increasing smartphone penetration, and supportive regulatory policies, mobile payments are expected to play an even more significant role in shaping India's financial ecosystem in the future.

**Key Words:** Mobile Payments, Economic growth, India, Financial Inclusion, Digital Transformation.

#### Introduction:

India's digital payment landscape has undergone a remarkable transformation in recent years, with mobile payments playing a pivotal role in driving economic growth. The introduction of mobile wallets and the Unified Payments Interface (UPI) has revolutionized the way people conduct financial transactions, making payments faster, more convenient, and highly secure.

Mobile wallets such as Paytm, Google Pay, and PhonePe have provided users with a seamless digital payment experience, reducing dependency on cash transactions. Meanwhile, UPI, introduced by the National Payments Corporation of India (NPCI) in 2016, has emerged as a game-changer by enabling instant and interoperable transactions between banks. This has significantly boosted financial inclusion, empowering millions of individuals and businesses, including those in rural and semi-urban areas, to participate in the formal economy.

The widespread adoption of mobile payments has led to increased transparency, reduced corruption, and enhanced efficiency in economic transactions. Furthermore, the Indian government's push for a cashless economy, especially through initiatives like Digital India and demonetization in 2016, has accelerated the adoption of digital payment solutions. As a re-

sult, mobile payments have not only contributed to the growth of e-commerce and small businesses but have also facilitated faster GDP growth by fostering a more inclusive and digital financial ecosystem. This paper explores the impact of mobile wallets and UPI on India's economy, examining their role in enhancing financial inclusion, reducing transaction costs, supporting overall economic expansion and 104 respondents' data was collected and analysed to arrive at a conclusion which help out to know whether mobile payments are revolutionising digital payments or not.

#### Objectives of the Study:

The primary objective of this study is to analyse the role of mobile payments, particularly mobile wallets and UPI, in driving India's economic growth. The study aims to explore the impact of digital payment systems on financial inclusion, economic efficiency, and consumer behaviour. The specific objectives are as follows:

- To examine the growth and adoption trends of mobile payments in India, focusing on the role of mobile wallets and the Unified Payments Interface (UPI).
- To evaluate the contribution of mobile payments to India's economic growth, analysing factors such as increased transaction efficiency, reduced cash dependency, and the expansion of digital commerce.
- To study consumer behaviour towards mobile payments, including factors influencing adoption, such as ease of use, security concerns, incentives, and government policies.

#### Conceptual Background:

The rise of mobile payments in India is rooted in the broader framework of digital financial services, which aim to provide seamless, secure, and efficient payment solutions. Mobile payments encompass transactions conducted using mobile devices, including mobile wallets and bank-integrated platforms like the Unified Payments Interface (UPI). These innovations align with the objectives of financial inclusion, reducing cash dependency, and enhancing economic efficiency.

**Mobile Wallets:** Digital wallets such as Paytm, Google Pay, and PhonePe allow users to store

money digitally and make payments for goods and services. They serve as an alternative to traditional banking transactions, particularly for those who lack easy access to physical bank branches.

**Unified Payments Interface (UPI):** Launched by the National Payments Corporation of India (NPCI) in 2016, UPI is a real-time payment system that enables instant peer-to-peer and merchant transactions. Unlike mobile wallets, UPI is directly linked to bank accounts, allowing seamless interoperability between different banks and payment service providers.

The adoption of mobile payments in India is driven by factors such as increasing smartphone penetration, affordable internet access, government initiatives like Digital India, and the Reserve Bank of India's (RBI) regulatory framework supporting digital transactions. Mobile payments have transformed India's financial landscape, reduced cash dependence and increasing transaction efficiency, thereby contributing to economic growth.

### Review of Literature

Numerous studies have explored the impact of mobile payments on financial inclusion, economic growth, and consumer behaviour. Below are key findings from relevant literature:

Demirgüç-Kunt et al. (2018) in the Global Findex Report highlight that digital payments have significantly contributed to financial inclusion by enabling unbanked populations to access banking services. In India, UPI and mobile wallets have bridged the gap between formal banking systems and underserved populations.

Sharma and Kukreja (2020) argue that mobile payments have facilitated easier access to financial services, particularly in rural India, where traditional banking infrastructure is limited.

Arora and Palvia (2019) found that mobile payments have accelerated economic transactions, reducing the cost of financial services and improving efficiency.

A study by the Reserve Bank of India (2021) reported that UPI transactions have significantly contributed to the growth of digital commerce and have reduced reliance on cash-based transactions.

Davis's (1989) Technology Acceptance Model (TAM) suggests that perceived ease of use and usefulness influence consumer adoption of digital payment systems. Several Indian studies (e.g., Singh et al., 2021) confirm that ease of transaction, cashback incentives, and government support drive the increasing adoption of UPI and mobile wallets.

Gupta and Arora (2022) examined consumer trust in mobile payments, finding that security concerns remain a key challenge despite growing acceptance.

The Indian government's Digital India initiative has played a critical role in expanding mobile payment adoption (Mehta & Mehta, 2020). Policies like demonetization in 2016 and subsidies for digital transactions have significantly boosted digital payment usage.

NPCI's (2023) annual report highlights that UPI transactions crossed billions of transactions per month, reinforcing its role as a cornerstone of India's digital economy.

### Analysis and Interpretation of the Data:

| Category                     | Option                | Percentage |
|------------------------------|-----------------------|------------|
| Gender                       | Female                | 55%        |
| Gender                       | Male                  | 45%        |
| Age Group                    | 18-24                 | 35%        |
| Age Group                    | 25-34                 | 40%        |
| Age Group                    | 35-44                 | 15%        |
| Age Group                    | 45+                   | 10%        |
| Occupation                   | Student               | 30%        |
| Occupation                   | Salaried Professional | 40%        |
| Occupation                   | Business Owner        | 20%        |
| Occupation                   | Other                 | 10%        |
| Fintech Usage Frequency      | Daily                 | 30%        |
| Fintech Usage Frequency      | Weekly                | 40%        |
| Fintech Usage Frequency      | Monthly               | 20%        |
| Fintech Usage Frequency      | Rarely                | 10%        |
| Preferred Mobile Payment App | Google Pay            | 45%        |
| Preferred Mobile Payment App | PhonePe               | 35%        |
| Preferred Mobile Payment App | Paytm                 | 15%        |
| Preferred Mobile Payment App | Others                | 5%         |
| Satisfaction Level           | Very Satisfied        | 35%        |
| Satisfaction Level           | Satisfied             | 40%        |
| Satisfaction Level           | Neutral               | 15%        |
| Satisfaction Level           | Dissatisfied          | 7%         |
| Satisfaction Level           | Very Dissatisfied     | 3%         |
| Security Concern             | Very Secure           | 25%        |
| Security Concern             | Somewhat Secure       | 50%        |
| Security Concern             | Neutral               | 15%        |
| Security Concern             | Not Secure            | 10%        |
| Fraud Experience             | Yes                   | 20%        |
| Fraud Experience             | No                    | 80%        |
| Government Promotion         | Yes                   | 75%        |
| Government Promotion         | No                    | 25%        |
| Future Usage                 | Yes                   | 85%        |
| Future Usage                 | No                    | 15%        |

### Source: Primary Data

Here are the correlation results:

#### 1. Age Group vs. Fintech Usage Frequency ! - 0.0013 (Very Weak Negative Correlation)

Age does not significantly impact how frequently people use mobile payments.

There is **no significant relationship** between age and how often people use mobile payments.

This means mobile payment adoption is **consistent across different age groups**, contradicting the assumption that younger people use it more frequently.

#### 2. Occupation vs. Satisfaction Level ! -0.0131 (Very Weak Negative Correlation)

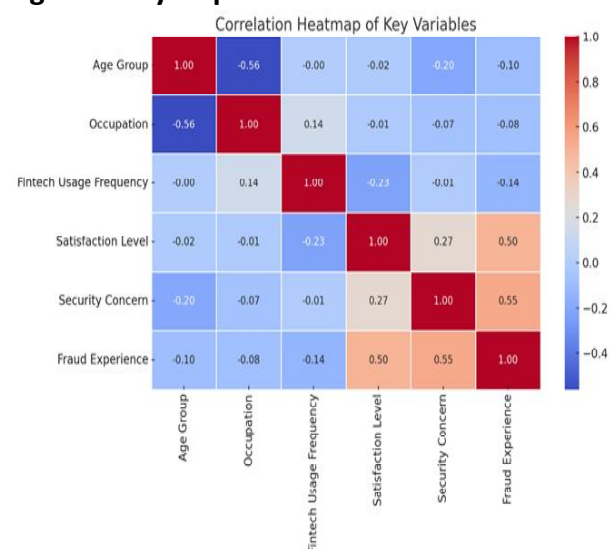
Job type has almost no impact on satisfaction with mobile payments.

#### 3. Security Concern vs. Fraud Experience ! 0.5456 (Moderate Positive Correlation)

People who have experienced fraud or unauthorized transactions tend to feel less secure about mobile payments.

People who have experienced fraud or unauthorized transactions tend to feel **less secure** about mobile payments.

This suggests that **past fraud incidents significantly impact trust** in fintech services.



**correlation heatmap** showing relationships between key variables.

• Darker colours indicate stronger correlations.

• The **Security Concern vs. Fraud Experience** correlation (0.55) is the most notable.

### Detailed Interpretation of the Correlation Heatmap

The heatmap visualizes relationships between key variables in the dataset, where:

• **Positive values (closer to +1) !** Strong direct relationship (as one increases, the other also increases).

• **Negative values (closer to -1) !** Inverse relationship (as one increases, the other decreases).

• **Near 0 values !** No significant relationship between variables.

#### Key Observations from the Heatmap:

1. Security Concern vs. Fraud Experience (0.55 – Moderate Positive Correlation)

• Finding: Users who have faced fraud or unauthorized transactions tend to feel less secure about mobile payments.

• Effect: Strengthening fraud detection measures and enhancing user confidence in security could improve fintech adoption.

2. Fintech Usage Frequency vs. Age Group (-0.0013 – No Correlation)

• Finding: Different age groups use mobile payments at similar frequencies.

• Effect: Unlike common assumptions, younger users do not necessarily use fintech more than older ones. Mobile payment adoption is evenly spread across age groups.

3. Satisfaction Level vs. Occupation (-0.013 – Very Weak Negative Correlation)

• Finding: Job type does not significantly influence how satisfied users are with mobile payments.

• Effect: Regardless of whether someone is a student, salaried employee, or business owner, satisfaction levels are similar.

4. Security Concern vs. Satisfaction Level (Weak Negative Correlation)

• Finding: Users who feel less secure about mobile payments tend to be less satisfied.

• Effect: Improving perceived security (e.g., fraud detection, customer protection) may enhance overall satisfaction.

5. Fraud Experience vs. Usage Frequency (Weak Negative Correlation)

• Finding: Users who have experienced fraud may reduce their mobile payment usage.

Effect: Negative experiences could lead to **lower adoption** if security issues persist.

#### Conclusion:

Security concerns strongly impact trust and satisfaction—reducing fraud can boost fintech adoption.

Age does not play a major role in fintech usage, suggesting mobile payments are widely accepted across demographics.

Occupations don't affect satisfaction, meaning fintech solutions appeal equally to different professional groups.

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## A Study on Digital Financial Literacy: An Overview

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### 1.0 Introduction:

In today's world, financial literacy is more important than ever, and with the rise of digital technologies, a new branch of financial literacy has emerged: digital financial literacy. This refers to the knowledge and skills required to navigate, understand, and use digital financial tools and services effectively and safely. Digital financial literacy is crucial because much of modern finance, from banking and investments to budgeting and payments, has moved online or onto digital platforms. People who are digitally financially literate can manage their money efficiently, protect themselves from fraud, and make informed decisions in an increasingly digital economy.

Digital Financial Literacy has expanded due to the development and decentralization of Fintech products and services. People are taking responsibility for their financial planning and becoming more financially independent, which ensures financial autonomy and inclusion. DFL not only improves financial inclusion but also empowers citizens to embrace a cashless economy and warns them against digital fraud, including phishing and hacking. The measure key

components of digital financial literacy are includes digital payment system such as Mobile payments: Using services like Apple Pay, Google Wallet, Venmo, or PayPal for transactions. Banking apps: Managing accounts, transferring money, and checking balances through mobile banking platforms. Cryptocurrency: Understanding how digital currencies like Bitcoin and Ethereum work, and the risks involved. Along with this Online Banking, Personal Finance Management Tools, Investing Digitally, Cybersecurity and Privacy, Digital Currency and Blockchain Technology, Financial Apps and Platforms and Digital Credit and Loans are much more significant in the recent years.

## 2.0 Significance of Digital Financial Literacy:

**2.1 Access to Financial Services:** A significant portion of the population relies on mobile phones or the internet for access to financial products and services, making digital literacy critical for financial inclusion.

**2.2 Financial Security:** With digital tools come digital risks. Being digitally literate helps individuals protect themselves from fraud, phishing scams, and identity theft.

**2.3 Better Money Management:** Digital tools can help people keep track of spending, build savings, and invest wisely, leading to improved financial stability and growth.

**2.4 Changing Economy:** The digital financial world is evolving rapidly. Cryptocurrencies, digital wallets, and online platforms are becoming commonplace, and understanding these tools is vital for making informed decisions.

## 3.0 Objectives of the Study:

1. To study the overview of digital financial literacy.
2. To study the digital financial literacy initiatives in India.
3. To study the challenges of digital financial literacy.

## 4.0 Research Methodology:

The present research is based on the descriptive type where overview of digital finan-

cial literacy studied as well as digital financial literacy initiatives in India. The challenges and barriers of financial literacy have been discussed.

## 5.0 Digital Financial Literacy Initiatives in India

Digital financial literacy initiatives in India have become increasingly important as the country moves towards a more digital economy. With the growth of internet access, mobile phones, and online banking, financial inclusion and digital literacy are crucial for empowering individuals to manage their finances effectively. Here are some key digital financial literacy initiatives in India:

### 1. Pradhan Mantri Jan Dhan Yojana (PMJDY)

**1. Overview:** Launched in 2014, PMJDY is a national mission for financial inclusion that aims to provide every household in India with access to financial services, such as banking accounts, credit, insurance, and pensions.

**2. Digital Component:** PMJDY accounts are linked to the Aadhaar system, allowing for easy access to banking services through mobile devices and digital platforms.

**3. Financial Literacy:** Along with the opening of bank accounts, financial literacy programs were launched to educate individuals on how to manage their accounts, use mobile banking, and understand basic financial products.

### 2. Financial Literacy Week (FLW)

**1. Overview:** Organized by the Reserve Bank of India (RBI), Financial Literacy Week (FLW) is held annually to promote financial literacy across the country. The week focuses on different aspects of financial inclusion and literacy, such as digital banking, safe financial practices, and understanding financial products.

**2. Digital Focus:** Digital financial products and services are highlighted, with an emphasis on educating citizens on using mobile banking, online payments, and understanding the risks and benefits of digital transactions.

### 3. National Centre for Financial Education

## (NCFE)

**1. Overview:** NCFE is an initiative supported by the Ministry of Finance and other financial regulators like RBI, SEBI, and IRDAI. It aims to promote financial literacy in India through various programs and resources.

**2. Digital Resources:** NCFE provides online resources, interactive courses, and mobile apps to help individuals understand personal finance, budgeting, digital transactions, investing, and saving.

**3. Campaigns:** NCFE's campaigns aim to educate various demographic groups, including school students, women, senior citizens, and rural populations, on how to manage their finances digitally.

## 4. Digital India Programme

**1. Overview:** Launched in 2015, Digital India is a flagship initiative of the Government of India aimed at transforming India into a digitally empowered society and knowledge economy.

**2. Financial Literacy Integration:** As part of the Digital India initiative, there has been an emphasis on promoting digital payments, banking, and financial inclusion through digital platforms.

**3. Mobile Payments:** The government encourages citizens to use digital payment methods like UPI (Unified Payments Interface), mobile wallets, and government apps (e.g., BHIM, PMGDISHA) for transactions, savings, and investments.

## 5. PMGDISHA (Pradhan Mantri Gramin Digital Saksharta Abhiyan)

**1. Overview:** Launched in 2017, this program aims to make at least one member from each rural household digitally literate.

**2. Financial Literacy Focus:** The program includes modules on using digital financial services like mobile wallets, online banking, and understanding digital transactions in a secure way.

**3. Impact:** By increasing digital literacy, PMGDISHA helps rural populations understand how to access banking services, government

schemes, and digital financial tools, thus improving their financial inclusion.

## 6. SBI's Digital Financial Literacy Initiatives

**1. Overview:** The State Bank of India (SBI) has conducted various financial literacy campaigns to promote digital banking and financial services.

**2. Programs:** SBI's "Digital Banking Awareness" and "SBI Financial Literacy Camps" educate people on how to use mobile banking, ATMs, UPI, and other digital financial products.

**3. Mobile Apps and Tools:** SBI provides tools such as the "SBI Buddy" mobile wallet and "YONO" digital banking app to facilitate easier access to banking services and enhance financial literacy.

## 7. RBI's Financial Literacy Drive

**1. Overview:** The Reserve Bank of India has launched several campaigns aimed at improving financial literacy, with a particular focus on digital financial services.

**2. Topics Covered:** These campaigns cover digital banking safety, mobile payments, online fraud prevention, and awareness of financial products like loans, credit cards, and insurance.

**3. Target Groups:** The RBI has focused on promoting digital literacy among different groups, including women, rural populations, and youth, to help them make informed decisions about using digital financial services.

## 8. Digital Financial Literacy by Paytm

**1. Overview:** Paytm, a major digital payment platform in India, offers educational resources and tutorials to help users understand how to use mobile wallets and digital payment methods.

**2. Tools:** Paytm's platform provides in-app guides, videos, and customer support to help users perform transactions securely, manage their accounts, and use the app's various financial services like recharges, bill payments, and money transfers.

## 9. India Post Payments Bank (IPPB)

**1. Overview:** Launched in 2018, IPPB aims to

provide accessible and affordable banking services to rural and underserved areas.

**2. Digital Services:** IPPB promotes the use of mobile phones and technology for digital banking services, such as savings accounts, money transfers, and bill payments.

**3. Training and Awareness:** IPPB has also rolled out various training sessions and campaigns to help people in rural areas become familiar with digital banking services.

## 10. Financial Literacy Content on YouTube and Social Media

**1. Overview:** In addition to institutional programs, there has been a rise in online content aimed at enhancing digital financial literacy. Influencers and financial experts often share tips, tutorials, and best practices for using digital banking and financial apps.

**2. Examples:** Channels and blogs like "Financial Education for Indians," "BasuNivesh," and "FinanceTube" educate people on topics like UPI, online security, and smart investing, often catering to a younger and tech-savvy audience.

## 6.0 Challenges and Barriers to Digital Financial Literacy in India:

Digital financial literacy, defined as the ability to use effective and secure digital financial services, is essential to fostering economic inclusion and growth. Despite significant advances in the expansion of digital financial services, India faces many challenges that hinder generalised adoption and effective use of these services. These challenges can be broadly categorized into awareness, infrastructure, financial literacy, security concerns, language barriers, trust issues, and regulatory challenges.

**1. Lack of Awareness:** Many individuals in India, particularly in rural areas, remain unaware of digital financial services and their benefits. This gap in awareness hinders the adoption of digital financial services, limiting economic opportunities and financial inclusion.

**2. Limited Digital Infrastructure:** Access to necessary digital infrastructure, such as

smartphones, internet connectivity, and digital payment systems, is still limited in many parts of India. Rural and remote areas are particularly affected, where basic digital amenities are often lacking, exacerbating the digital divide.

**3. Low Levels of Financial Literacy:** A significant portion of the Indian population has limited understanding of basic financial concepts such as interest rates, credit scores, and savings. This low level of financial literacy impedes individuals' ability to make informed decisions about digital financial services, further entrenching economic disparities.

**4. Security Concerns:** The prevalence of cyber threats, including phishing, malware, and hacking, poses a significant barrier to the adoption of digital financial services. According to the Indian Computer Emergency Response Team (CERT-In), India experienced 1.391 million reported cyber fraud cases in 2022. Many users lack the knowledge and skills to protect themselves from cyber fraud, leading to hesitancy in using digital financial services.

**5. Rural Adoption:** In rural and semi-urban areas, awareness and understanding of security practices related to digital payments are often limited. Ensuring that these users are educated about safe transaction practices is crucial for expanding digital financial literacy.

**6. Connectivity Problems:** Despite improvements in mobile internet penetration, many areas in India still suffer from unreliable or limited connectivity. This digital divide is stark, with only 15% of rural households having access to good internet services compared to 42% in urban areas. Women, particularly in poorer households, are disproportionately affected by digital illiteracy.

**7. Technology Disruptions:** Digital financial systems, including the Unified Payments Interface (UPI), can experience technical glitches and downtimes, disrupting transactions and causing inconvenience. Network congestion during peak usage times can also lead to delays and

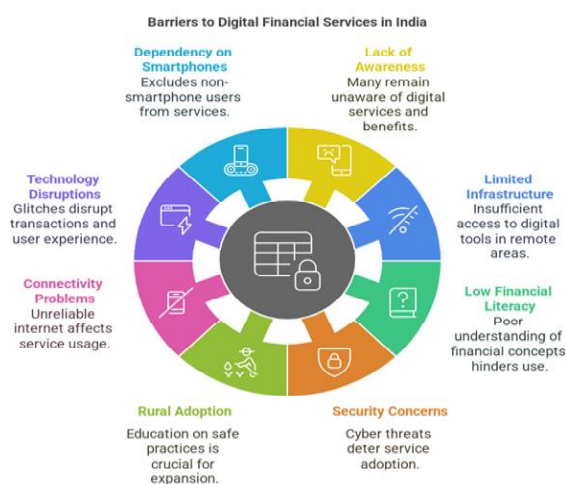
failed transactions.

**8. Dependency on Smartphones:** The reliance on smartphones for UPI transactions excludes individuals who do not own these devices or are uncomfortable using digital technology. This dependency poses a significant barrier to universal digital financial literacy.

**9. Limited Language Support:** Digital financial services often rely heavily on English, which is not widely spoken or understood in many parts of India. The lack of multilingual support creates a language barrier, preventing non-English speakers from effectively accessing these services.

**10. Lack of Trust in Financial Institutions:** Many Indians have a low level of trust in financial institutions, which can deter them from using digital financial services. This distrust is often rooted in perceptions of corruption and inefficiency within these institutions.

**11. Fake Apps and Websites:** The proliferation of fake UPI apps and phishing websites designed to steal personal and financial information poses a significant threat. These fraudulent platforms can deceive unsuspecting users, leading to financial losses and eroding trust in digital financial services.



The government, financial institutions, and other stakeholders must work together to address these issues and guarantee that every-

one has access to digital financial services and the know-how to utilize them safely and effectively. In order to promote economic inclusion and enable people to fully engage in the digital economy, it is imperative that digital financial literacy be improved in India.

## 7.0 Conclusion:

Digital financial literacy is necessary for all those who focus on a modern financial landscape. This offers people skills and knowledge to make justified, safe and effective financial decisions in digital technology. Whether it's a matter of budget management, investing in behavior, securing personal financial data, or digital financial expansion are key steps towards achieving empowerment and financial security in today's digital world.

India's push towards digital financial literacy is a key component of the broader financial inclusion programme. By leveraging digital platforms and financial literacy programs, India aims to ensure that every citizen, regardless of their location or economic status, has access to the tools and knowledge needed to participate in the digital economy. While challenges remain, these initiatives are helping India move towards greater financial empowerment for all.

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## Challenges for Agriculture Sector with Consumer Centric Policy of Government

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### Abstract

The young generation of rural India is mostly school or college dropouts and educationally backward because of different issues which lead highest unemployment ratio in rural India. Different factors like unemployability, unsatisfactory income, drought, and fewer educational or medical facilities lead to urban migration in India. This urbanization can be reduced by providing employability, and uplifting the socio-economics of the farmer by providing different money-generating sources apart from traditional farming. There are different challenges to the Agriculture Sector such as service quality, hurdles in providing the service, infrastructural scarcity, multilevel medium at regional levels, educational background of the farmers and, Government subsidies (Singh, 2016).

As Agriculture Sector is a demanding sector in the future, there is a severe need to promote Agriculture Sector among farmers to save agricultural land, increase the socio-economic status of farmers and reduce the urbanization among the rural youth.

### 1. Introduction: -

As part of the consumer centric policy, the central government has implemented a one-step program to reduce the prices of agricultural commodities, and the dryland farmers of all regions, including Marathwada, have

been hit the hardest. It is one of the important reasons why rainfed agriculture is becoming popular.

The prices of agricultural commodities such as cotton, soybeans, tur, urad, gram, tomato, onion, wheat, rice have been pushed down several times in the last three years by the policies implemented by the government as a temporary solution to inflation.

As a result, a large population of the Maratha community, who depended on agriculture, faced financial difficulties. This issue is responsible for rekindling the issue of Maratha reservation in Marathwada.

After the Covid-19 epidemic, there was a good boom in the prices of agricultural commodities in the international market. Soybean and cotton growers also benefited somewhat in the 2021 season. But after an outcry from industry and consumers, the government started slashing farm prices. For this, the weapons of huge reduction in import duty, free import, export ban, stock limit were used arbitrarily.

The government does not intervene when prices of farmers' commodities fall. But as the prices increased, the consumers began to cry, but the government woke up with a rude awakening. In the last kharif, the guaranteed price of tur was Rs 6,300 per quintal, while the farmers had to sell tur below Rs 6,000. But the government did not buy tur from the farmers.

But now the number has reached 12 thousand. This time, however, the government promptly imported tur from abroad at a cost of Rs 8,000 to 9,000. The same quota was dropped in the case of Urad. Due to these disastrous policies of the government, the pulse farmers abroad get higher prices and the domestic farmers are wiped out.

This year, despite the drought-like situation, the central government continued its policy of lowering prices, resulting in a double

dilemma for the farmers. This year, the government has taken decisions like wheat and rice export ban, movement of wheat import from Russia, tomato import, 40 percent export duty on onion, huge import of edible oil.

## 2.Literature Review: -

To reduce the price of edible oil in the country, the government opened the door for imports. The government allowed duty-free import of 40 lakh tons of soybean oil and sunflower oil each in the two years 2022-23 and 2023-24. Due to this, the import of soybean oil in the country increased and the price of soybeans was greatly affected.

Soybean is the major crop in Marathwada along with Vidarbha and the entire agricultural economy depends on soybeans. Due to the policies of the government, this economy has only worsened. It has directly affected the farmers, but overall economic transactions have slowed down due to reduced purchasing power. It has affected all industries and businesses.

Price higher than the guaranteed price means inflation, which is the biggest injustice to the farmers. Either MSP is not based on C2 i.e., all costs. When Lal Bahadur Shastri established the Agricultural Price Commission, the guarantee price i.e., minimum price was announced. That is, the farmers had the right to get more than this price.

Therefore, the price of the government is slightly higher than the guaranteed price, that the policy of lowering the price by importing is not only anti-farmer but also against the development of the country. If the wages of farm workers are not increased, how will the poverty in the country be removed? If the price of grain does not increase, how will the wages increase?

## 3.Objective of Study: -

1. To study various problems faced by Indian farmers
- 2.To study the emerging challenges

facing Indian agriculture

### 3. Research Methodology: -

The data needs for research will be broadly classified into three categories. For the specified research primary and secondary data is needed. Secondary data will be collected directly from the tourism centers. Primary data will be collected from social media using NLP algorithms, the farmers interview, survey techniques, questionnaire and etc. The raw dataset will be prepared with primary and secondary data.

### 4. Data Collection and Analysis: -

Reduction in import duty

Types of Edible Oil -Tariffs in 2021 -Present  
Tariffs

Crude soybean oil -38.50 -5.5

Refined soy oil- 45 -13.75

Crude Palm Oil -35.75- 5.5

Refined palm oil- 49.5 -13.75

Crude sunflower oil- 38.50- 5.5

Refined sunflower oil -45 -13.75

Struggle to bring down the price of pulses

- Five-year contract for import of tur, moong, urad in 2021.

- Adoption of open policy by abolishing quota system for increase in Tur, Urad imports.

- Decision to import tur from abroad instead of purchasing tur from farmers.

- Stock limit applicable on Tur and Urad on June 20, 2023.

- Limits on purchases of tur from exporters in Africa were lifted in August 2023, deciding to buy maximum tur from farmers there.

Fresh wounds of government policy

- Decision on wheat export ban on 13 May 2023.

- Ban on export of non-basmati white rice on July 20, 2023.

- Decision to import tomatoes from Nepal on 15 August 2023.

- 40 percent duty on onion exports on August 19.

- Decision to import 3 lakh bales of cotton

from Australia in April 2022.

- Duty waived on import of soybean oil and sunflower oil from 11 May to 30 June 2023.

Strike of the futures

The central government imposed a one-year ban on seven agricultural commodity futures on 20 December 2021 in response to the rise in agricultural commodity prices. These included soybeans, mustard, wheat, rice, gram, gram and crude palm oil. Later, soybean oil, soybean meal, mustard oil and mustard meal were also included in it.

In December 2022, the ban was extended by another year. Due to this farmer stopped getting price information and trends from futures. Futures were used by the government to lower tariffs.

### 5. Result: -

The agriculture sector plays a major role in the Indian economy, accounting for 18 percent of the country's GDP and providing employment to nearly 50 percent of the population.

Some of the major challenges facing Indian agriculture today are:

**a. Small and fragmented land:** The average farm size in India is small, with about 85 percent of farms less than 2 hectares in size, which can make it difficult for farmers to make a profit.

**b. Water Scarcity:** India has a high population density and a large agricultural area, which puts pressure on water resources, making it difficult for farmers to irrigate their crops. Soil

**c. Degradation:** Unsustainable farming practices such as excessive use of pesticides and fertilizers lead to soil erosion and reduced crop yields in many parts of India.

**d. Lack of Market Access:** Smallholder farmers in India often face difficulties in accessing markets to sell their produce, which can limit their income and economic growth.

**e. Food Security:** India has a large popula-

tion and high levels of food insecurity, which requires increasing food production and food security. It must be ensured that it is accessible and affordable to all.

**f. Climate change:** India is particularly vulnerable to the effects of climate change, such as changing weather patterns and increased frequency of extreme weather events, which can reduce crop yields and make farming more difficult.

**g. Diseases:** Pests and diseases can significantly affect crop production in India and are difficult to control due to the lack of effective pest management systems.

**h. Labor Shortage:** Many farmers in India are facing labor shortages due to immigration policies and lack of interest in agriculture as a career.

**i. High-Cost of Production:** The cost of production is rising, along with the cost of inputs such as seeds, fertilizers and fuel, which can make it difficult for farmers to make a profit.

**j. Technological gap:** All farmers in India have access to advanced technologies, such as precision agriculture, which cannot limit their ability to increase productivity and efficiency.

#### **6.Discsion: -**

Indian agriculture faces several challenges, including outdated farming practices, inadequate irrigation facilities, fragmented land holdings, over-reliance on monsoons, soil degradation, lack of modern technology, and post-harvest losses. To address these challenges and improve agricultural productivity, the government of India has implemented various initiatives:

**1. Pradhan Mantri Krishi Sinchayee Yojana (PMKSY):** This scheme focuses on creating efficient water usage through various components like watershed management, rainwater harvesting, and distribution of water-saving equipment.

**2. National Mission for Sustainable Agricul-**

**ture (NMSA):** NMSA promotes sustainable agriculture practices by encouraging farmers to adopt climate-resilient crops, efficient water use, and soil health management techniques.

**3. Paramparagat Krishi Vikas Yojana (PKVY):** PKVY promotes organic farming methods and helps farmers shift from conventional to organic farming, thereby reducing dependence on chemical inputs.

**4.Soil Health Card Scheme:** Under this scheme, farmers receive soil health cards, providing information on soil fertility and recommendations on suitable crops and fertilizers, helping farmers make informed decisions.

**5.Pradhan Mantri Fasal Bima Yojana (PMFBY):** This crop insurance scheme protects farmers against losses caused by natural calamities, pests, and diseases, ensuring financial stability in times of crop failure.

**6. National Agriculture Market (eNAM):** eNAM is an online trading platform that connects agricultural markets across the country, enabling farmers to sell their produce at competitive prices and reducing intermediaries' role.

**7.Rashtriya Krishi Vikas Yojana (RKVY):** RKVY provides financial assistance to states for planning and executing various agriculture-related projects, including infrastructure development, research, and extension services.

**8. National Food Security Mission (NFSM):** NFSM aims to increase the production of rice, wheat, and pulses through area expansion, yield enhancement, and improved farm practices, ensuring food security for the nation.

**9. MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act):** While not exclusively an agricultural initiative, MGNREGA provides employment opportunities in rural areas, which indirectly benefits agriculture by addressing labor scarcity during peak agricultural seasons.

**10. Promotion of Research and Develop-**

**ment:** The government invests in agricultural research and development, encouraging the development of new crop varieties, farming techniques, and technologies to enhance productivity and sustainability.

#### 7. Conclusion: -

A significant and sustained increase in farmers' income and the transformation of agriculture require a paradigm shift in the entire approach towards agriculture sector. Changes in archaic regulations and liberalization of the sector are a must for creating an enabling environment for a modern and vibrant agriculture. Advancement in science led technology, an enhanced role of private sector in both pre and postharvest phases, liberalized output market, active land lease market and emphasis on efficiency will equip agriculture to address the challenges of 21st century and contribute towards the goal of a new India. A well-coordinated action and strategy between the Centre and the states is needed to ensure that agriculture marches to the next stage of development along with the other sectors.

#### 8. Suggestion: -

Measures were initiated to substantially increase agricultural production and support industrial development to meet the growing needs of the population, including steps to increase both extensive cultivation and intensive cultivation. For the former, large areas were provided with irrigation facilities on a growing basis and areas hitherto unsuitable for cultivation. was adapted for cultivation. For the latter, a new agricultural policy was introduced in 1966 in the form of a package program in selected regions of the country. To sustain and expand the program in larger and larger areas of the country, to increase the production of high-yielding seeds, fertilizers and pesticides in the economy and, when necessary, domestically through imports. Steps were taken to supplement the production. This has made the country self-reliant, we have gone from being a major importer of food grains to a net exporter of food grains.

#### 9. Limitation and Future Studies: -

The challenge facing ecological agriculture science is to achieve sustainable or regenerative mainstream productive food systems. To enter the field of ecological agriculture, location relative to the consumer can reduce the food mile factor to help reduce biosphere damage due to combustion engine emissions involved in current food transportation. Like conventional agriculture, ecological farm design is initially limited by: local climate, soil physical properties, budget for beneficial soil supplements. Manpower and available automations; However, long-term water management through ecological farming practices has the potential to conserve and increase water availability for the site, and requires much less input to maintain fertility.

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## Importance and challenges in digital payment system

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### Objectives of the Study:

- 1) To study the Concept of digital payment system
- 2) To study the types of digital payment system
- 3) To study the importance of digital payment system
- 4) To study challenges of digital payment system
- 5) To give proper Suggestion.

### Abstract:

A digital payment system refers to any electronic method or platform that allows users to make financial transactions online or electronically, without the need for physical cash or checks. These systems enable the transfer of money, payment for goods or services, and other financial operations through the use of digital devices such as smartphones, computers, or specialized payment terminals.

### Introduction:

Digital payment systems are essential for a modern, efficient, and secure financial ecosystem. They enhance convenience for consumers, lower transaction costs, promote financial inclusion, and support the growth of businesses and the economy as a whole. With the rise of e-commerce and the increasing digitalization of everyday life, digital payments have become an integral part of the global financial system. A digital payment system refers to any electronic

method or platform that allows users to make financial transactions online or electronically, without the need for physical cash or checks. These systems enable the transfer of money, payment for goods or services, and other financial operations through the use of digital devices such as smartphones, computers, or specialized payment terminals.

#### 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 banks.

##### 2. Secondary Data:

The secondary data is derived from the following sources:

1. Books
2. Magazines

#### Meaning:

A digital payment system refers to any electronic method or platform that allows users to make financial transactions online or electronically, without the need for physical cash or checks. These systems enable the transfer of money, payment for goods or services, and other financial operations through the use of digital devices such as smartphones, computers, or specialized payment terminals.

#### Key Features of Digital Payment Systems:

**1. Online Transactions:** Digital payment systems enable users to make payments for goods and services via websites, mobile apps, or point-of-sale systems.

**2. E-payment Methods:** These systems can include various payment methods such as credit/debit cards, bank transfers, mobile wallets (e.g.,

Apple Pay, Google Pay), and digital currencies.

**3. Security Features:** They often incorporate encryption, multi-factor authentication, and other security measures to protect the transaction process from fraud and unauthorized access.

**4. Instant Payment Processing:** Transactions are typically processed in real-time or within minutes, providing convenience and speed.

#### Types of Digital Payment Systems:

**1. Credit and Debit Card Payments:** Description: One of the most common forms of digital payment, where users can make payments using their credit or debit card details (card number, expiration date, and CVV). Platforms: Used on websites, mobile apps, and in-store using POS (point-of-sale) terminals. Examples: Visa, MasterCard, American Express.

**2. Mobile Wallets (E-Wallets):** Description: Digital wallets allow users to store their payment information securely on their mobile devices for easy and quick access to make payments. Features: They can store multiple payment methods, loyalty cards, and other important information. Examples: Apple Pay, Google Pay, Samsung Pay, PayPal, Venmo, and M-Pesa (in some countries).

**3. Bank Transfers:** Description: Direct transfer of funds from one bank account to another, typically using a banking app, internet banking platform, or third-party service. Features: It is a secure method for paying bills, sending money, or purchasing goods online. Transfers may take from instant to several business days, depending on the service used. Examples: NEFT, RTGS, IMPS (India), ACH transfers (U.S.), SEPA (Europe).

**4. Crypto currency Payments :** Description: Digital currencies like Bitcoin, Ethereum, and others allow for peer-to-peer payments without the involvement of banks or central authorities. Features: Crypto currencies offer a decentralized and secure way to pay for goods and services, often with lower fees and faster international transactions.

**5. QR Code Payments :** Description: Payment systems where customers scan a QR code (Quick Response Code) with their mobile device to make a payment. Features: This type of payment is common for both online and offline transactions and is popular in countries like China and India.

**6. Peer-to-Peer (P2P) Payments:** Description: Platforms that allow individuals to send money directly to one another without the need for banks or third-party financial institutions. Features: P2P payments are often used for personal transactions, like paying a friend for dinner or sending money to family.

**7. Contactless Payments :** Description: A type of digital payment that allows users to pay for goods and services by simply tapping their debit or credit card, smartphone, or smart watch on a point-of-sale terminal. Features: These payments are fast and do not require entering a PIN for small transactions (usually under a certain limit). Examples: NFC-based payments (Near Field Communication), Apple Pay, Google Pay, contactless bank cards.

**8. Buy Now, Pay Later (BNPL) :** Description: This service allows consumers to purchase products or services and pay for them in installments at a later date. Features: It is increasingly used for e-commerce purchases, with consumers making small payments over a period, often without interest if paid on time.

**9. Direct Carrier Billing :** Description: A method where payments are charged directly to a user's mobile phone bill, often used for digital purchases like apps, subscriptions, or digital content. Features: Convenient for users who may not have access to credit/debit cards or bank accounts. Examples: Google Play Store, Apple App Store (for certain digital purchases).

**10. E-checks (Electronic Checks) :** Description: A digital version of a paper check that allows users to make payments from their bank account to a merchant or service provider. Features: E-checks are often used for recurring payments

or large transactions and offer more security than paper checks. Examples: ACH payments in the U.S., e-checks for utility bills.

**11. Mobile Banking USSD Payments :** Description: For users in areas with low internet connectivity, mobile banking through USSD codes (Unstructured Supplementary Service Data) enables payments and money transfers without needing a smartphone or internet connection. Features: Simple and accessible for users in rural or underserved areas.

#### **Importance of digital payment:**

**1. Convenience and Accessibility:** 24/7 Availability: Digital payment systems allow consumers and businesses to conduct transactions anytime and anywhere, eliminating the need to visit physical banks or carry cash. Ease of Use: With smartphones and computers, making payments is as simple as a few taps or clicks, whether for shopping, bill payments, or peer-to-peer transfers.

**2. Enhanced Security:** Reduced Risk of Theft: Digital payments help minimize the risk of physical cash being lost or stolen. Many systems use encryption and two-factor authentication, making online transactions safer than carrying cash or cards. Fraud Prevention: Advanced fraud detection algorithms in digital payment systems can quickly identify suspicious activities, reducing the likelihood of financial fraud.

**3. Faster Transactions: Instant Payments:** Digital payment systems enable real-time transactions, which significantly speed up the payment process compared to traditional methods like checks or bank transfers. Cross-border Transactions: Sending money internationally becomes quicker and more cost-effective compared to traditional bank wire transfers.

**4. Cost Efficiency :** Lower Transaction Costs: Digital payments often have lower processing fees compared to traditional payment methods like credit card swipes or wire transfers. This benefits both consumers and businesses. Reduced Cash Handling Costs: Businesses can

save money on cash management, such as counting, storing, and transporting cash, which is both time-consuming and costly.

**5. Financial Inclusion :** Access to Banking Services: Digital payment systems enable people who don't have access to traditional banking infrastructure (especially in remote or underserved regions) to participate in the economy by using mobile wallets or other digital payment platforms. Empowering the Unbanked: People without bank accounts can use mobile money services, providing them with a means of sending and receiving money and accessing other financial services.

**6. Improved Business Operations :** Streamlined Transactions: Businesses can process transactions more efficiently, track payments, and manage finances with fewer manual processes. Customer Insights: Digital payments provide businesses with valuable data about consumer spending habits, enabling personalized marketing, product recommendations, and better inventory management.

**7. Promoting E-commerce Growth :** Seamless Integration with Online Shopping: Digital payment systems are essential for online retailers, enabling fast, secure, and simple transactions. The growth of e-commerce is directly tied to the efficiency of digital payment systems. Increased Customer Confidence: A variety of secure payment options encourages customers to shop online with confidence, knowing their transactions are safe.

**8. Environmental Benefits:** Paperless Transactions: Digital payments eliminate the need for paper receipts and checks, contributing to a more sustainable, paperless environment.

**9. Government and Tax Compliance :** Transparency and Record Keeping: Digital transactions provide clear records, which can help reduce corruption and ensure that businesses comply with tax regulations. This can be especially important for governments in tracking financial activity and preventing fraud.

**10. Support for Innovation :** Integration with New Technologies: Digital payment systems enable the adoption of technologies such as block chain, crypto currency, and AI, helping businesses stay competitive and innovative. Smart Payment Systems: The evolution of contactless payments and digital wallets (e.g., Apple Pay, Google Pay) showcases how digital payment systems are shaping the future of financial transactions.

#### **Challenges of digital payment system:**

**1. Security Risks and Fraud :** Cyber security Threats: Digital payment systems are often targeted by hackers, exposing users to risks such as data breaches, identity theft, and unauthorized transactions. Phishing and Fraud: Fraudulent schemes like phishing, where attackers deceive users into revealing personal or financial information, can undermine trust in digital payment systems. Account Takeovers: Hackers gaining access to accounts via weak passwords or compromised authentication methods can lead to unauthorized transactions.

**2. Privacy Concerns :** Data Privacy: Digital payments involve the collection of sensitive data, such as financial information, transaction history, and personal details. Improper handling or data breaches could expose users to privacy violations. Tracking and Surveillance: The ability to track user spending habits and behaviors raises concerns about excessive surveillance, leading to worries about personal privacy and data misuse.

**3. Technological Barriers :** Limited Internet Access: In regions with poor or no internet connectivity, users may struggle to access or use digital payment systems, limiting their effectiveness. Device Compatibility: Some digital payment platforms may not be compatible with older devices, preventing certain users from accessing or using the services. Technical Failures: System outages, bugs, or server issues can disrupt the smooth operation of digital payment systems, leading to downtime or transaction

errors.

**4. User Awareness and Trust:** Lack of Understanding: Many users, especially in developing regions, may not fully understand how digital payment systems work, leading to reluctance or errors when using them. Trust Issues: Concerns over security and fraud may deter some users from adopting digital payment methods, especially if they are unfamiliar with the technology or have experienced issues in the past.

**5. Regulatory and Legal Challenges :** Unclear Regulations: Digital payment systems, especially in emerging markets, may face uncertainty regarding government regulations, taxation, and compliance. Different countries have different rules governing digital payments, creating confusion for businesses and consumers. Cross-Border Payments: When dealing with international payments, differences in laws, currencies, and regulations can complicate transactions, making it difficult for businesses to offer consistent services across borders.

**6. Financial Exclusion:** Limited Access to Banking: While digital payments can promote financial inclusion, they still require users to have access to smartphones, computers, or bank accounts, which may not be available to certain populations. Unbanked and Under banked Populations: In many parts of the world, a large portion of the population remains unbanked or under banked, limiting their ability to participate in the digital payment ecosystem.

**7. Infrastructure and Cost :** Investment in Infrastructure: Digital payment systems require substantial investment in technology infrastructure, such as servers, secure payment gateways, and customer support systems. For small businesses, this can be a significant barrier to adoption. Transaction Fees: While digital payments are generally cost-effective, certain payment platforms or methods may charge high fees for transactions, especially for international payments, which can deter consumers and businesses from using them.

**8. Digital Divide:** Inequality in Technology Access: Not all individuals have equal access to smartphones or computers, especially in rural or low-income areas. This digital divide creates inequality in the ability to use digital payment systems, excluding a segment of the population from the benefits of digital commerce.

**9. Integration with Existing Systems :** Compatibility with Traditional Systems: Integrating digital payment solutions into existing business models or legacy systems can be complex and costly for businesses that have relied on traditional cash-based transactions or older technologies. Complexity for Small Businesses: Small businesses may face challenges in adopting digital payment systems due to the complexity of integrating them into their current processes, as well as the initial setup costs.

**10. Dependence on Technology:** System Downtime or Failures: The dependence on digital infrastructure means that any system outages or technological glitches can disrupt payments, leading to financial losses or customer dissatisfaction. Power and Internet Connectivity: In regions with unreliable electricity or internet access, the continuous use of digital payments may not be feasible, causing interruptions in services and limiting the adoption of digital payment methods.

**11. Consumer Resistance :** Preference for Cash: In certain cultures or age groups, consumers may prefer using cash for transactions due to familiarity, privacy concerns, or mistrust of digital systems. Reluctance to Change: Some users may be resistant to change, especially older individuals or those who are not tech-savvy, making the adoption of digital payments slower in certain demographics.

**12. Increased Costs for Merchants:** Transaction Fees: While digital payments often reduce operational costs, merchants may still face transaction fees for processing payments, which can add up over time, especially for small businesses. Compliance Costs: Businesses need to

invest in ensuring their payment systems comply with regulations, implement security measures, and handle potential legal challenges, which can be costly.

#### Conclusion:

While digital payment systems offer immense benefits, they come with significant challenges, ranging from security concerns to infrastructure limitations. Addressing these challenges is essential for the widespread adoption and successful integration of digital payments in the global economy. For businesses, consumers, and governments, overcoming these hurdles will help unlock the full potential of digital payment systems while minimizing risks. Digital payment systems are essential for a modern, efficient, and secure financial ecosystem. They enhance convenience for consumers, lower transaction costs, promote financial inclusion, and support the growth of businesses and the economy as a whole. With the rise of e-commerce and the increasing digitalization of everyday life, digital payments have become an integral part of the global financial system.



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## THE RISE OF SHE-COMMERCE: WOMEN SHAPING THE LANDSCAPE OF E-COMMERCE

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#### Abstract:

The arrival of e-commerce has created many opportunities for women entrepreneurs worldwide. The trade, which depicts women-led online businesses, has seen exponential growth in recent years. The digital revolution has given women the opportunity to break traditional obstacles and make their place in the online marketplace. This article examines factors that contribute to the emergence of She-commerce, the challenges facing women entrepreneurs and the influence of women leading digital businesses on economic development. It also examines guidelines and strategies that can support women in e-commerce. **She-Commerce**, a term denoting women-led online business, has witnessed exponential growth in recent years. Women are leveraging technological advancements, digital payment solutions, and social media marketing to enter the online marketplace. The future of e-commerce is undeniably and that the trade is not just a trend, but a movement to shape global economies. With the emergence of internet penetration and social media platforms, women entrepreneurs utilize digital devices to expand access and scale their businesses. Fintech solutions, digital marketing and access to e-commerce platforms have further improved growth, which enables economic freedom and economic authority. As she continues to develop trade, it will be impor-

tant to ensure continuous success for women - led companies. The rise of She-Commerce is more than just an economic shift—it is a revolution where women are becoming architects of a new digital era.

**Keywords:** She-Commerce, Women Entrepreneurs, E-Commerce, Digital Business, Gender Empowerment, Online Marketplace

### 1.Introduction:

The global expansion of e-commerce has provided women entrepreneurs to establish and score their businesses, technological advances, digital payment solutions and social media marketing to enter the electronic marketplace to enter the online marketplace. Despite significant progress, women still face obstacles such as lack of financing, gender bias and digital literacy intervals, and prevent their complete participation. To support women's entrepreneurs requires targeted initiatives, including access to special training programs, mentors' networks and financial resources, which fit their unique challenges. In addition, promoting policies that encourage gender equality in digital space and address social norms that eliminate these obstacles, essential for long -term permanent growth. Strong women strengthen strong economies that inject into racking are not just an alternative, but a need for a prosperous digital future. Cooperative efforts between governments, private sector institutions and non-governmental organizations can play an important role in creating a playground and highlighting the woman's full potential in the digital economy.

### 2. Objectives of the Study

1. To analyse the development of women entrepreneurs in e -commerce.
2. Identify the challenges that women face in the digital trade scenario.
3. To evaluate the influence of that trade in economic and social development.
4. To propose politics and strategies to increase women's participation in e -commerce.

### 3. The Growth of She-Commerce:

**1.Technological progress:** Women benefit from AI-operated marketing, social media platforms and e-commerce sites to increase business operations.

**2. Access to global markets:** Online marketplaces such as Amazon, Etsy and Shopify give women a platform to reach international concentrations.

**3. Rise of Home-Hall Company:** Flexible work environments enable women to manage businesses with

**4.Social media and impressive marketing:** Platforms such as Instagram, Facebook and Tikok have enabled women to create personal brands and develop their businesses with minimal investments. For example, many women entrepreneurs use Instagram wheels to market handmade products, fashion lines and beauty brands.

**5.Subscription-based models:** Women entrepreneurs quickly launch brands such as FAB bags, my NV box and Lady Raga, which cures beauty and welfare products through monthly member boxes. These services provide customers with a personal and practical way of detecting high quality skin care, makeup and self-care, required things while supporting Homegrown businesses.

**6. Dropships and print-on-demand:** Many women entrepreneurs enter e-commerce through drops or printing businesses, which reduces advance cost. For example, printful and tea jumping allows to design and sell clothes without handling inventory.

**7. Empowerment through online learning:** Platforms such as Udemy, Coursera and Skillshare enable women to learn business and marketing skills to improve their e-commerce companies. For institution, thousands of Women signs up for digital marketing courses to optimize their online stores.

**8. Rise of Women-Centric Marketplaces:** As launch women, platforms and women -owned wallets, dedicated places to women entrepreneurs, which give their products and networks places dedicated to showing it with equally ideo-

logical business owners.

#### **4. Challenges Faced by Women in E-Commerce:**

**1. Economic obstacles - Limited access to credit and investment opportunities.** Many women struggle to secure money due to lack of security or investor appraisal for women's-nervous businesses.

**2. Digital skills GAP - Lack of technical expertise in the management of websites, web space and analyses makes it difficult for women entrepreneurs to scale their businesses.**

**3. Social and cultural obstacles - Gender Prejudice and lack of family deficiency prevents the growth of entrepreneurship, especially in Orthodox communities where women's commercial roles are not encouraged.**

**4. Regulatory and legal questions-E-trade laws, tax complications and compliance with developed guidelines are challenging to navigate e-commerce for women entrepreneurs.**

**5. Limited networking opportunities - Women often have less networking opportunities than their male colleagues, which reduces the opportunities to collaborate, achieve mentorship and now new markets. Examples: Many women-high start-ups struggle to find investors due to lack of industry connections.**

**6. Balance for working life- Balance that controls a business with household responsibility can be heavy, leading to burnout. Examples: Women who run home-based business often struggle to assign the time dedicated to scaling their obligations.**

**7. Market access and visibility - Women entrepreneurs face challenges in gaining visibility on large platforms dominated by brands installed. Examples: Companies led by small women can be difficult to compete with large players on platforms such as Amazon and Flip maps due to limited marketing budgets.**

**5. Impact of She-Commerce on Economic Development:**

**1. Job Creation: Online companies led by job**

creation women generate employment opportunities, especially for other women, promote inclusive economic growth.

**2. Financial Independence: An increase in economic freedom economic participation strengthens women and reduces gender income inequality, which enables more economic security and decision-making power.**

**3. Innovation and diversity: Women provide unique approaches to product growth and business strategies, leading to different offers and customer-focused solutions.**

**4. Community Development-Many She Commerce ventures focuses on trade stability, education and social welfare, and positively affects local communities.**

**5. Promoting local economies-women entrepreneurs often strengthens the source and local supply chains of materials and products from small-scale suppliers, craftsmen and rural companies. Example: Craft-based businesses run by women contribute to the development of traditional art forms and livelihoods in the countryside.**

**6. Digital changes and inclusion-She Commerce encourages the use of digital equipment and economic inclusion, which helps women entrepreneurs to integrate into a formal economy. Examples: Digital payment systems such as UPI and e-wallet have enabled women to expand the customer base and to streamline transactions.**

**6. Strategies for Enhancing Women's Participation in E-Commerce:**

**1. Skill Development Program - Strengthening women with training in digital marketing, financial management and technology, to convert ideas to wealthy businesses. Knowledge is power, and unlock skill success!**

**2. Financing and investment assistance - Special grants and microfinance schemes help to bridge the economic difference, enabled women to start and score their obligations. A small capital can create a world of opportunities!**

3. Political Reform - Governance initiatives that break up obstacles and create bridges for commercial environment of gender material, promote equal opportunities for women entrepreneurs. Strong policy, strong business!

4. Networking and mentorship - Creating platforms where interested women entrepreneurs join in with industry leaders and investors receive the right guidance and support. When women lift each other, the business grows!



#### 7. Conclusion and Recommendations:

She changes the global e-commerce scenario of strengthening women entrepreneurs. Female companies run a digital economy, innovation, employment generation and financial inclusion. Despite progress, however, economic obstacles, technical obstacles and social prejudices continue to prevent their full capacity. In order to maintain this speed, authorities, financial institutions and private sector institutions should work together to create a competent environment for women entrepreneurs. Increasing access to funding, providing digital literature programs and promoting mentorships is more inclusive and essential steps towards the fair digital economy. The emergence of She-commerce is not just an economic change-it is a movement that re-defines entrepreneurship, where women are no longer just participants, but leaders in the digital revolution. By breaking the obstacles, embracing innovation and creating strong support systems, the future of trade will continue

to grow, and unlock endless opportunities for women around the world. She-Commerce is more than just a business trend—it's an economic revolution led by women who dare to dream bigger. Women entrepreneurs are not waiting for doors to open; they are building their own digital empires, rewriting the rules of business, and shaping a future where gender is no longer a barrier to success. She-Commerce is not just the future—it is the present, and women are here to stay, innovate, and lead!

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## Problems and Prospectus of Digital Payment Adoption

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**Abstract:** Digital payments entail the movement of money or value exchange through electronic methods, primarily utilizing digital devices and the internet. When compared to traditional paper-oriented payment ways such as cash, this method of transaction has gained considerable favor due to its enhanced convenience, rapidity, and security. Consumers and organizations now anticipate digital payment facilities to be made available for faster and more secure transactions, with no charges, little risk, and more security.

The digital payment ecosystem operates with multiple intermediaries collaborating harmoniously to ensure a seamless transaction. The entities involved in the end-to-end processing of a digital payment transaction include the merchant (payee), the consumer (sender of payment), the financial institution, and the payment network.

The adoption of digital payment systems has surged globally, yet several challenges hinder their widespread acceptance. Key issues include cybersecurity threats, privacy concerns, limited financial and digital literacy, inadequate infrastructure in developing regions, and regulatory uncertainties. Additionally, resistance to change, transaction costs, and unreliable internet connectivity further impact adoption. Addressing these challenges requires collaborative efforts from governments, financial institutions, and technology providers to enhance

security, improve accessibility, and foster user trust. This paper explores the barriers to digital payment adoption and suggests strategies to promote inclusive, secure, and efficient financial transactions in an increasingly digital economy.

**Key Words:** Digital Payments Concept, Types, Adoption Problems, Recommendations

### 1. Digital Payments India



As part of its Digital India initiative, the Government of India has been pushing to create a cashless economy. To this end, the government has introduced digital payments in India. Digital payments occur via online mediums and require no physical exchange of money. These payment systems have gained mainstream popularity, leading to the emergence of various modes of financial transactions. As a business owner, you should be well-informed about the different types of digital payment systems and use them to your advantage while conducting business.

Digital payments additionally provide the payee the capability to gather customer information for data analysis and market segmentation purposes. This empowers retailers and issuing banks to utilize digital payments in conjunction with loyalty and incentive schemes, aiming to enhance customer acquisition and retention through personalized marketing initiatives and tailored promotions. To modernize financial systems, enhance efficiency, and in-

crease overall transaction convenience, organizations, governments, and financial institutions have been encouraging the adoption of digital payment technology. The use of digital payments streamlines financial transactions, reduces reliance on physical money, and empowers people to effectively manage their accounts and conduct business using a variety of digital tools.

## 2. Objective of the study

To study the conceptual background of **Digital Payments**

To understand **Digital payments** types use and benefits in India

To know **Digital payments adoption problems in India**

To recommendation for **Digital payments adoption**

## 3. Types of digital payment systems in India

Today, you can efficiently conduct online transactions by choosing your preferred digital payment solutions, including the following:

**Bank cards:** Bank cards include Prepaid, Debit, or Business or Commercial Credit Cards as alternatives to cash payments. Customers use Credit and Debit Cards for multiple reasons such as convenience, safety, mobility, etc.

**Unstructured Supplementary Service Data (USSD):** USSD is designed to include sections of Indian society that do not have access to proper banking facilities. Customers can use USSD to execute mobile banking transactions without an internet-enabled smartphone. They can simply dial \*99# using any phone to utilise banking services such as interbank fund transfers, balance inquiries, etc.

**Aadhaar Enabled Payment System (AEPS):** The National Payments Corporation of India launched AEPS to leverage Aadhaar authentication for banking purposes. Customers can use their Aadhaar-enabled bank accounts to transfer funds without any physical activity. Customers can also use AEPS to initiate digital payments at PoS (Point of Sale) terminals and micro ATMs

using biometric and Aadhaar Card information.

**United Payments Interface (UPI):** UPI is a digital payments system that brings various bank accounts under a single application. This feature allows easy money transfers between parties with just a few clicks. Customers do not need a card or bank details, making it a popular digital payment method.

**Mobile wallets:** Mobile wallets enable customers to carry cash digitally. Users can link their bank accounts to the wallet and enjoy secure digital transactions or use the balance to transfer money.

**Internet and mobile banking:** Internet banking has allowed customers to avail themselves of modern banking and financial services via a bank's website. Similarly, Mobile Banking enables users to access a bank's services via apps downloaded on mobile devices.

## 4. Benefits of digital payment solutions

In a heavily populated country like India, digital payments can help reduce disparity and boost inclusivity. The benefits of electronic payments systems in India are as follows:

**Easy and convenient:** Digital payments are a boon to customers since they are easy to access and operate. Plus, customers do not have to depend on cash and can make payments quickly. Moreover, digital payments do not require physical presence and enable customers to conduct remote transactions conveniently.

**Economically progressive:** Customers are more likely to opt for online payments when they can conduct transactions conveniently. Thus, more people can engage in e-commerce and transfer money electronically. Such movement of funds and the growth of online businesses contribute to the development of the economy.

**Safe transactions:** Dealing with cash can come with its own risks and hassles. With digital payments, you can securely store your money digitally. Methods like passwords and biometric authentication on phones make digital payment incredibly safe.

## 5. Problems of digital payment adoption in India

**Lack of Infrastructure:** Infrastructure for digital payments is still missing in some places. This implies that those residents would not have access to digital payment choices, or that those options might be scarce or unreliable. Many rural areas in India do not have reliable internet access. This makes it difficult for people to learn about and use digital technologies. Rural areas often lack the basic infrastructure needed to support digital literacy, such as schools, libraries, and community centers with computers and internet access.

**Poor Internet Connectivity:** India is a big country with a diverse population, and not everyone there has access to the Internet. The inability of many rural communities to access the internet makes it challenging for residents to use digital payment services. Digital payments rely heavily on internet connectivity, yet residents in India's most rural areas are unable to use them because of intermittent connectivity problems.

**Cash Dependency and Habit:** Cash remains dominant in India despite government efforts to encourage digital payments. Cash is still preferred over digital payments, which some people may view as less reliable or safe. Cash is still used for many small transactions, and many individuals choose it because it is more convenient and familiar. As it is said that "Old Habits Die Hard", people are using cash for a very long time and they have in it and feel secure about it. They think that by using cash, everything is in their control and they feel safe about it, and they do not want to change the existing system of transactions.

**Rural Adoption:** According to a Nielsen survey, there are 352 million internet users in rural India, which is 20% more than there are in urban India. However, the report noted that due to a lack of digital literacy, roughly 60% of rural Indians are not actively utilizing the Internet. According to the survey, connectivity issues are to

blame for the low adoption rate because many rural areas in India lack the necessary internet speed. Major bottlenecks include a lack of reliable infrastructure and a steady supply of electricity. Rural areas often have fewer

**Lack of Willingness to Adopt Digital Payments:** Although customers are increasingly using digital payments, many businesses still prefer cash payments. This is caused in part by the expense of receiving digital payments and the challenge of transaction reconciliation. According to a research paper by Ligon E. et al. (2022), despite significant efforts to encourage adoption, India's adoption rate in particular remains low. Using survey data from 1,003 Jaipur merchants, it is discovered that the low adoption rate is not a supply-side issue because the necessary infrastructure is available.

**Security Reasons:** Unauthorized payment connections, fraudulent UPI handles, and screen monitoring by fraudsters are a few of the potential concerns associated with UPI (Mistry, 2022). Mobile payments are susceptible to fraud, including unauthorized purchases and false returns. Both businesses and consumers may suffer financial losses as a result of this. Utilizing trustworthy payment processors and routinely keeping an eye out for suspicious activities are crucial for reducing this risk.

**Digital Illiteracy:** More information and awareness about digital payments are required. Some individuals might not understand how to use digital payment platforms or may not be aware of the advantages of doing so. Only 14.7% of India's population is computer literate and 20% of the population uses the internet.

## 6. Recommendations for Digital payments adoption

- Conducting awareness campaign about the usefulness of the digital payment system.
- Infrastructural development to provide reliable and secured modern payment transaction.
- Establish clear regulations to ensure

security and transparency.

- Arrangement of training on data security, usages and access.
- Providing incentives and rewards in the form of cashback, loyalty points and discounts on various services.
- Design user-friendly interfaces for diverse demographics.

## 7. Conclusion

Digital payment systems have seen significant global growth, several challenges continue to impede their widespread adoption. Key issues include concerns about cybersecurity and privacy, limited access to the necessary infrastructure in developing regions, and a lack of digital literacy among users. Additionally, the complexity of digital payment systems, regulatory barriers, and the risk of financial exclusion for marginalized populations further complicate adoption efforts.

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## STUDY OF ROLE OF SBI IN PROMOTING DIGITAL FINANCIAL LITERACY IN SANGLI DISTRICT

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### Abstract

Digital financial literacy is essential for financial inclusion, especially in rural Area, where access to banking services remains limited. State Bank of India (SBI) has been actively involved in promoting financial literacy across various regions. During Financial Literacy Week 2024, SBI conducted numerous financial awareness and education programs nationwide. SBI play a crucial role in bridging the digital divide by promoting financial literacy through various initiatives. This paper explores the strategies of bank employ, challenges they face, and the impact of digital financial literacy programs on rural communities, with a focus on specific case studies in Sangli

**Key Words:** Digital, financial, literacy, rural, initiatives

### Introduction

The rise of digital banking has transformed financial transactions in India. However, rural areas still struggle with low financial literacy, lack of infrastructure, and limited access to banking services. The government's push towards a cashless economy, with initiatives such as Jan Dhan Yojana and Digital India, necessitates a greater focus on digital financial literacy. Banks serve as key facilitators in educating rural populations about digital banking, secure transactions, and financial management.

### Objectives of the Study

1. To examine the role of SBI bank in promoting digital financial literacy in Sangli
2. To analyze bank initiatives aimed at enhancing digital financial literacy among rural populations in the Sangli district.
3. To identify the challenges faced by bank in implementing digital financial literacy programs.
4. To assess the impact of digital financial literacy programs on rural economic development.

### Methodology of the Study

This study adopts qualitative methods to analyze the role of SBI in promoting digital financial literacy in Sangli District. The methodology includes reviewing existing reports and government policies related to digital financial literacy and banking initiatives. Analyzing data from SBI financial literacy reports, Studying examples from rural Maharashtra, including SBI's Digital Literacy Drive in Sangli, assessing the effectiveness of these programs through comparing findings from banks and rural regions to identify best practices and also evaluating the overall impact of digital financial literacy programs on rural economic development.

### Analysis and Interpretation

SBI plays a vital role in Promoting Digital Financial Literacy in rural populations. SBI organize financial literacy camps to educate rural populations on using digital banking tools such as mobile banking, UPI, and online transactions. These programs aim to reduce digital indecision and build trust in digital financial services. Participants receive practical training on using digital payment platforms, mobile banking apps, and ATMs. Banking officials provide real-time demonstrations of secure transactions using UPI, net banking, and Aadhar Enabled Payment Services (AEPS). Depending on the literacy levels of participants, banks develop simple and easy-to-understand training content in regional languages. Camps specifically focus on farmers, small business owners, women entrepreneurs, and self-help groups to improve financial par-

ticipation. Banks sometimes offer incentives such as cash back, waived transaction fees, or assistance in setting up digital accounts to encourage adoption. Surveys and feedback forms help measure participants' understanding and identify areas for further training.

Banks collaborate with NGOs to implement financial literacy programs. The Reserve Bank of India (RBI) and National Bank for Agriculture and Rural Development (NABARD) also support such initiatives through policy frameworks and funding. Banks are increasingly promoting mobile banking applications and SMS-based services to enhance accessibility for rural users. Simplified user interfaces and multilingual support help overcome literacy barriers. Banking Correspondents act as intermediaries between banks and rural customers. Training programs equip BCs with digital banking knowledge, enabling them to guide customers in using digital financial services securely. A significant barrier to digital adoption in rural areas is the fear of fraud. Banks conduct awareness campaigns to educate customers about cyber security measures, safe banking practices, and fraud prevention.

While specific details about SBI's digital financial literacy initiatives in Sangli district, Maharashtra, notable effort in the region includes Bank of Maharashtra's initiative in 2016, where they transformed Malangaon village in Sangli district into a completely cashless village by linking Aadhaar to bank accounts and conducting educational drives on digital transactions.

SBI extended its digital literacy initiative to Sangli district, focusing on educating small farmers, women entrepreneurs, and self-help groups on digital banking solutions. The program included:

**1. Interactive Training Sessions:** SBI organized village-level training programs where banking officials demonstrated digital transactions, net banking, and mobile banking services.

**2. SHG Digital Empowerment:** Special training sessions were conducted for SHGs, helping women entrepreneurs understand digital payments, online loan applications, and savings account management.

**3. Localized Awareness Campaigns:** SBI launched awareness campaigns in regional languages to ensure maximum outreach and participation.

The initiative trained over 7,000 individuals, leading to a substantial rise in digital transactions and greater financial independence among women entrepreneurs in the region.

### Challenges Faced by Banks

**1. Low Digital Literacy:** Many rural individuals lack basic digital skills, making digital financial adoption difficult. A significant portion of the rural population has limited exposure to digital devices such as smart phones and ATMs. Moreover, the lack of formal education makes it challenging for them to understand financial concepts, cyber security threats, and digital transaction processes. Limited awareness about online banking, UPI transactions, and digital wallets further hinders adoption. Additionally, many elderly individuals and women, especially in conservative rural societies, face restrictions on accessing digital financial tools due to societal norms.

**2. Infrastructure Gaps:** Inadequate internet penetration and unreliable electricity supply hinder digital banking adoption. Many rural areas experience frequent power outages, limiting the ability to use digital banking services effectively. Additionally, weak or no mobile network coverage in remote villages restricts access to online transactions and mobile banking applications.

**3. Language and Cultural Barriers:** The diversity of languages and traditional banking practices make digital transition slower. Many rural individuals are unfamiliar with banking terminologies and digital interfaces, leading to confusion and hesitation in using digital financial

tools. Furthermore, cultural norms in some regions discourage women from actively engaging with banking services, creating an additional barrier to digital financial inclusion.

**4. Cyber security Concerns:** Fear of fraud and lack of trust in digital transactions limit participation.

#### **Impact of Digital Financial Literacy Programs**

Studies indicate that digital financial literacy programs have led to increased adoption of digital banking in rural areas. Farmers, small business owners, and self-help groups (SHGs) benefit from improved financial management and access to credit. The overall economic empowerment of rural communities is evident in enhanced savings, reduced dependency on cash, and better financial planning.

#### **Conclusion**

Banks play a pivotal role in driving digital financial literacy in rural India. By implementing targeted educational initiatives, leveraging technology, and collaborating with government bodies, banks can accelerate financial inclusion. Overcoming infrastructural and educational barriers is essential for achieving widespread adoption and ensuring that rural populations fully benefit from digital financial services. The case study of SBI's initiative in Sangli demonstrates how structured digital literacy programs can empower rural communities and promote economic development through financial inclusion.

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## **Government Efforts and Their Impact on Digital Financial Literacy and Digital Payment Systems in Rural India: A Study of E-Governance Strategies**

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#### **Abstract:**

This research explores the government's efforts in enhancing digital financial literacy and promoting digital payment systems in rural India, with a focus on e-governance strategies. The study examines various government initiatives, including Pradhan Mantri Jan Dhan Yojana (PMJDY), PMGDISHA, and Digital India, which have played crucial roles in expanding digital financial services in rural areas. The paper explores how these programs have impacted financial inclusion and the adoption of digital payment systems, while also addressing the challenges rural populations face in adopting these technologies. Using a combination of qualitative and quantitative methods, the study identifies key factors that influence the success of digital financial literacy campaigns and the promotion of digital payments.

**Keywords:** Digital Financial Literacy, Digital Payment Systems, E-Governance, Rural India, Government Initiatives, Financial Inclusion, Digital India, PMGDISHA.

#### **1. Introduction**

The digital revolution in India has transformed how financial services are delivered, with government efforts playing a key role in facilitating the adoption of digital technologies. Rural India, with its significant population, presents

unique challenges and opportunities in this context. Despite the rapid growth of mobile phone usage and internet access in rural areas, there is a significant gap in financial literacy and the adoption of digital financial tools. Government initiatives aimed at improving digital literacy and promoting digital payments are essential to bridging this gap.

The central government's initiatives, such as **Pradhan Mantri Jan Dhan Yojana (PMJDY)**, **Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA)**, and the **Digital India** campaign, have been instrumental in enabling rural communities to engage with formal financial services. However, several barriers, including lack of infrastructure, low digital literacy, and socio-cultural factors, hinder their widespread adoption.

This paper investigates the impact of government efforts on digital financial literacy and digital payment systems in rural India, with a particular focus on e-governance strategies. The research aims to identify the key factors contributing to the success of these initiatives and explore the challenges faced by rural populations in adopting these systems.

## 2. Review of Literature:

Researcher has explored studies that discuss both the Digital Financial Literacy and Digital Payment Systems in Rural India. Here's a comprehensive breakdown of the key themes and articles that included in the literature review:

### 2.1 Digital Financial Literacy in Rural India:

Digital financial literacy refers to the ability of individuals to use digital platforms for managing their financial transactions, understanding financial products, and making informed decisions regarding savings, investments, and borrowing. Rural India, however, faces a considerable challenge in terms of digital financial literacy. According to a report by the National Centre for Financial Education (NCFE), only 27% of rural Indians are financially

literate, compared to 37% in urban areas (NCFE, 2023). This gap underscores the need for targeted government interventions to improve financial literacy.

The **Pradhan Mantri Jan Dhan Yojana (PMJDY)**, launched in 2014, aimed to provide every household in India with a bank account, thereby promoting financial inclusion. The program has been successful in opening over 46 crore bank accounts as of 2021 (Ministry of Finance, 2021). However, the challenge remains in ensuring that account holders can effectively use their accounts for digital transactions, access insurance, and benefit from government subsidies through direct transfers.

### 2.2 Digital Payment Systems and Rural Adoption:

The introduction of digital payment systems, such as **Unified Payments Interface (UPI)**, **Bharat Interface for Money (BHIM)**, and **Aadhaar Enabled Payment System (AEPS)**, has revolutionized how payments are made in India. These systems provide easy, low-cost methods for transferring money and accessing government benefits. Studies by **Deloitte India (2020)** have shown a rise in the adoption of mobile payment systems among rural populations due to the widespread availability of smartphones and mobile internet.

However, challenges persist in rural areas, such as poor internet connectivity, limited access to smartphones, and a lack of understanding of how to use digital payment systems. Research by **Choudhury et al. (2021)** found that while digital payment systems are becoming increasingly popular in urban areas, their adoption in rural India is slow due to infrastructural gaps and digital illiteracy.

### 2.3 E-Governance Strategies and Digital Transformation

E-governance strategies are designed to leverage digital technologies for delivering government services more efficiently. In the context of rural India, e-governance has played a

**significant role in enabling access to financial services. Programs such as PMGDISHA and Aadhaar have been crucial in bringing government services to rural populations.**

The **PMGDISHA** program, for instance, aims to make rural citizens digitally literate by providing training on basic digital tools, including financial applications. According to **Sethi and Jha (2020)**, the program has trained millions of rural individuals, which has resulted in increased participation in government schemes like direct benefit transfers (DBT) and digital payment systems.

Moreover, the **Digital India** initiative, launched in 2015, has focused on enhancing the availability of internet access, improving infrastructure, and promoting digital literacy. A study by **Niti Aayog (2021)** highlighted that the initiative has contributed to an increase in the number of internet users in rural areas, with a corresponding rise in digital transactions.

### 3. Objectives of the study:

1. To study government policies and initiatives aimed at improving digital financial literacy in rural India.
2. To identify challenges faced by rural communities in adopting digital financial systems.
3. To explore the impact of these government efforts on financial inclusion in rural India.
4. Research Methodology:

This research employs a mixed-method approach, combining qualitative and quantitative research to examine the impact of government efforts on digital financial literacy and payment systems in rural India.

The research is exploratory in nature and focuses on understanding the factors that influence the adoption of digital financial systems in rural areas. The study analyzes the effectiveness of government initiatives, including PMJDY, PMGDISHA, and Digital India. The primary data is collected through survey and observation from rural residents and Secondary data is collected from the available publications such as Govern-

ment reports, research papers, and publications from organizations like the Ministry of Finance, NITI Aayog, and the Reserve Bank of India (RBI).

### 5. Data analysis and interpretation:

#### 5.1. Impact of Government Initiatives on Digital Financial Literacy:

Government initiatives have significantly raised awareness of digital financial tools in rural areas. According to the survey data, 65% of rural respondents reported having used a mobile phone for banking or payments after the launch of PMJDY. The **PMGDISHA** program has also led to increased digital literacy, with 50% of participants stating they now use digital tools for financial transactions.

#### 5.2. Adoption of Digital Payment Systems:

The adoption of digital payment systems has been slow but steady in rural areas. UPI and BHIM have been particularly popular due to their simplicity and wide accessibility. However, the survey revealed that only 45% of rural users regularly use digital payment systems, with the primary barriers being lack of internet connectivity (30%) and fear of fraud (25%).

#### 5.3. Role of E-Governance in Promoting Financial Inclusion:

E-governance strategies have played a key role in promoting financial inclusion in rural India. The integration of **Aadhaar** with banking services has made it easier for rural residents to access financial services, especially in remote areas. However, the challenge remains in ensuring the security and privacy of digital transactions.

#### 5.4. Challenges:

**Infrastructure Issues:** Poor internet connectivity and limited access to smartphones remain major barriers.

**Digital Illiteracy:** While programs like PMGDISHA have made significant progress, a significant proportion of rural residents still lack the skills to use digital financial tools effectively.

**Trust and Security:** A lack of trust in digital systems and concerns over cybercrime are also

deterrents for adoption.

**Social and Cultural Barriers:** Skepticism towards digital tools, preference for cash transactions, and lack of trust in the digital ecosystem.

#### 6. Conclusion:

Government efforts through initiatives like Pradhan Mantri Jan Dhan Yojana, PMGDISHA, and Digital India have made significant strides in improving digital financial literacy and promoting digital payment systems in rural India. However, challenges such as infrastructure gaps, digital illiteracy, and security concerns persist.

To ensure greater success, there is a need for enhanced digital infrastructure, targeted awareness programs, and stronger security measures. Further research and continued government support will be crucial in achieving sustainable financial inclusion for rural India.

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## Role of Startups in India's Economic Growth: Opportunities and Challenges

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### Abstract

In recent years, startups have become a vital engine driving India's economic growth. They not only foster innovation and create jobs but also contribute significantly to expanding the country's GDP. The past decade has seen an unprecedented surge in startups, propelled by supportive government initiatives, technological advancements, and greater investment opportunities. This paper delves into the crucial role startups play in bolstering India's economy, examining the opportunities available to them and the challenges they encounter. Through descriptive research, we analyze various sectors where startups have made a notable impact. Our findings reveal that although startups have opened up numerous job opportunities and catalyzed digital transformation, they still face several hurdles, such as regulatory complexities, financial limitations, and fierce market competition. We conclude with recommendations aimed at fortifying the startup ecosystem to promote sustainable economic growth.

**Keywords:** Startups, Economic Growth, Policies, Digital Transformation, Venture Capital, Market Challenges, Entrepreneurial Ecosystem

### Introduction

Startups have become a defining element of India's economic landscape, significantly transforming the country's financial

progress. The surge of startup culture can be attributed to rapid technological advancements, increasing digital adoption, and favorable government policies. Today, India boasts the third-largest startup ecosystem globally, with thousands of innovative companies emerging across diverse sectors like fintech, healthcare, edtech, and artificial intelligence.

The rise of startups is largely fueled by economic liberalization, the proliferation of digital technologies, and an increasingly supportive regulatory environment. Government programs such as **Startup India, Make in India**, and **Digital India** have played a critical role in providing support for entrepreneurial ventures. Moreover, access to venture capital, angel investors, and foreign direct investment (FDI) has enabled startups to scale their businesses faster than ever. Nonetheless, despite remarkable growth, India's startup ecosystem faces numerous challenges. Regulatory obstacles, difficulties in securing funding, infrastructure issues, and intense market competition are just a few of the significant barriers that threaten the long-term sustainability of startups.

### Objectives of the Study

1. To explore how startups contribute to India's economic growth.
2. To identify the challenges faced by startups in India.
3. To offer recommendations for nurturing a robust startup ecosystem.

### Research Methodology

This study uses a descriptive research methodology, drawing on secondary data from various sources, including government publications, industry reports, academic journals, and financial analyses. We investigate existing literature on the contribution of startups to economic growth and assess statistical data relating to startup success in India. By synthesizing these diverse sources, we strive to provide a comprehensive understanding of the Indian startup ecosystem.

## The Role of Startups in India's Economic Growth

### 1. Employment Generation and Skill Development

Startups play a crucial role in generating employment, particularly in technology-driven sectors. They offer opportunities for young professionals, engineers, and entrepreneurs to innovate and expand their skill sets. Many focus on training and development, aligning workforce capabilities with industry needs.

### 2. Innovation and Digital Transformation

Startups are at the forefront of innovation, utilizing cutting-edge technologies like artificial intelligence, blockchain, and cloud computing. The digital revolution has empowered startups to create disruptive business models, significantly influencing industries such as fintech, healthcare, and logistics. Noteworthy unicorns like Paytm, BYJU'S, and Zomato have reshaped traditional business frameworks.

### 3. Contribution to GDP and Economic Expansion

The startup ecosystem substantially contributes to India's GDP, generating revenue and attracting investments. The rise of startups enhances productivity across multiple sectors, which in turn boosts overall economic performance. Foreign investment in Indian startups has increased, bolstering the nation's standing in the global economy.

### 4. Government Support and Policy Interventions

Programs such as **Startup India** and **Make in India** have introduced tax benefits, regulatory easements, and funding access for startups. Reforms aimed at simplifying the business climate have further facilitated the growth of new ventures. Collaborative efforts between the public and private sectors have encouraged innovation and research-oriented startups.

### Challenges Faced by Startups in India

#### 1. Regulatory Hurdles

Complex compliance requirements, in-

cluding adherence to GST, labor laws, and tax regulations, can overwhelm new startups. Lengthy bureaucratic processes for registering businesses, acquiring licenses, and protecting intellectual property slow operations and deter entrepreneurship. Furthermore, frequent policy shifts regarding taxation, foreign investment, and funding create strategic uncertainty for startups.

## 2. Financial Constraints

Many startups struggle with financing, reliant on external investment that is often hard to secure. There's a notable lack of funding for nascent companies, which cripples their ability to scale.

## 3. Market Competition

The competitive landscape can be daunting, with established players dominating the market, making it hard for new entrants to gain traction.

## 4. Scalability and Sustainability Issues

Expanding beyond metropolitan areas poses significant challenges for startups. Many lack the awareness and resources needed to penetrate rural markets, and establishing customer trust in a saturated market dominated by brand giants is difficult.

## 5. Economic and Political Uncertainty

Economic downturns, such as those experienced during the COVID-19 pandemic, can significantly hamper startup operations and funding. Fluctuating government policies and geopolitical tensions add layers of instability to the ecosystem.

## 6. Cybersecurity and Data Privacy Concerns

As digital threats rise, startups handling sensitive customer data face substantial cybersecurity risks. Compliance with data protection regulations also requires investments that smaller firms may struggle to manage.

## 7. Gender and Diversity Challenges

Women entrepreneurs often confront unique obstacles, including biases and limited funding opportunities. Additionally, a lack of diversity in startup leadership can stifle innovation and decision-making.

## 8. Exit Barriers for Startups

Many startups face hurdles when trying to succeed through mergers and acquisitions or

public offerings due to various constraints, including market competitiveness and legal obligations involved in shutting down a failed business.

## Suggestions for Strengthening the Startup Ecosystem

**1. Simplifying Regulatory Processes:** Streamlining the processes for business registration and tax compliance can make it easier for startups to launch and operate.

**2. Enhancing Access to Funding:** Strengthening government-backed financing programs and creating robust venture capital networks will help startups acquire the necessary funding.

**3. Promoting Entrepreneurship Education:** Integrating entrepreneurship into academic curricula can foster a more startup-friendly culture among young people.

**4. Expanding Infrastructure:** Improving both digital and physical infrastructure, such as internet connectivity and co-working spaces, will support startup growth.

**5. Encouraging Rural and Sector-Specific Startups:** Providing incentives for startups focused on essential sectors and those operating in rural regions can enhance their impact.

## Conclusion

Startups are pivotal to advancing India's economic landscape by driving innovation, creating jobs, and contributing to GDP growth. Driven by government support, digital transformation, and investment opportunities, the startup ecosystem has made impressive strides. However, regulatory barriers, funding challenges, and market competition remain significant obstacles. Addressing these challenges through thoughtful policy reforms, improving access to financial resources, and enhancing infrastructure will further bolster India's startup ecosystem. As the country aims to become a global hub for startups, fostering an environment conducive to innovation and entrepreneurship will be essential for long-term economic prosperity.

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## A STUDY ON RURAL ARTISANS BUSINESS AS A BOOSTER OF RURAL DEVELOPMENT WITH SPECIAL REFERENCE KOLHAPUR DISTRICT

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### ABSTRACT

The new economic policy (NEP) in India was implemented in 1991, aiming to liberalize and privatize the Indian economy. The main objective of NEP is to increase economic growth and improve the standard of living of the people. However, the impact of NEP on rural artisans' businesses has been a topic of debate since its implementation. This research paper aims to evaluate the impact of NEP on rural artisans' businesses. With reference to rural India, it is said that India lives in its villages, occupying more than 60 per cent of its population currently, which may be vulnerable to change in economic conditions. Hence in order to understand impact of the new economic policy especially on the rural part of India, and on rural businesses and to test, whether the new economic policy is really benefitting the rural India this study was necessary.

**Key Words:** Village Artisans, LPG, NEP.

### 1. INTRODUCTION:

In rural India, rural artisans are considered as an important part of social structure, apart from farmers. These rural artisans like potter, carpenter, black smith, cobbler, shepherd, weavers, gavandi, burud and tailor etc. are in-

involved in doing their traditional businesses, involving use of traditionally inherited skills. These artisans contribute greatly to the economy and self-sufficiency of the villages, and are an important source of self-employment. Considering nature of their business, these artisans mostly use traditional tools and machines in their business and mostly fulfills the local needs, also their requirements related to the finance is also limited. The new economic policy has brought both challenges and opportunities for this part of the society in the form of large-scale production, low cost of products, aggressive marketing, planned business strategies etc. by medium and large-scale businesses on one side and availability of better infrastructural facilities, educational and training facilities etc. on the other side.

## **2. RURAL ARTISANS BUSINESS AND THE NEW ECONOMIC POLICY:**

Rural artisans constitute a significant portion of India's population, and their businesses are an essential source of employment and livelihood in rural areas. Rural artisans typically work in the handicrafts and handloom sectors, producing a variety of goods, including textiles, pottery, metalwork, and wooden crafts. The NEP's impact on rural artisans' businesses can be evaluated through its impact on the handicraft and handloom sectors. NEP aimed to liberalize and privatize the Indian economy by reducing government intervention and encouraging private sector participation. This led to a significant shift in the market structure, with large corporations dominating the economy. The shift in the market structure and emphasis on the private sector had several implications for rural artisans' businesses.

### **1. Competition:**

The NEP led to an increase in competition in the domestic market, with large corporations entering the market. This resulted in rural artisans facing increased competition, which had a severe impact on their businesses. Due to the

lack of resources, rural artisans could not compete with large corporations in terms of production, marketing, and pricing, leading to reduced profits and decreased market shares.

### **2. Industry concentration:**

The NEP resulted in industry concentration, with large corporations dominated the economy. The concentration of manufacturing and service industries shifted away from rural areas, leading to a decline in rural artisans' businesses. The decline in the demand for rural artisan products led to reduced incomes, lower profits, and increased unemployment in the rural areas.

### **3. Technology:**

The NEP aimed for the introduction of new technology to enhance productivity, which had a negative impact on rural artisans. The introduction of new technology was beyond the reach of the rural artisans, leading to the widening of technological disparities between rural artisans and large corporations. This resulted in rural artisans being unable to keep up with technological advancements, which led to a decline in their businesses.

### **4. Export competitiveness:**

NEP aimed to increase export competitiveness by encouraging the production of export-oriented goods. Large corporations were well-positioned to take advantage of this policy due to their resources, leaving rural artisans struggling to export their products. Rural artisans lacked the resources to produce goods in large quantities, and low productivity led to higher prices, reducing their competitiveness in the export market.

### **3. OBJECTIVES OF THE STUDY:**

1. To study the socio-economic status of artisans in Indian economy.
2. To study the importance of artisans in rural economy.
3. To examine the impact of new economic policy on business volume.

### **4. HYPOTHESES OF THE STUDY:**

1. There is an adverse impact of new economic policy on the business of rural artisans.

2. There is no social support to artisans.

### 5. RESEARCH METHODOLOGY:

This is exploratory study. Purposive Quota sampling method was adopted for this present study. Data for the study have been collected from both Primary and Secondary sources.

#### 1.5.1 Primary Data:

The primary data related to micro level study were collected personally through intensive field work, questionnaire and personal discussion with the village artisans.

#### 1.5.2 Secondary Data:

Secondary data includes Census Report, Plan documents of Central and State Government, Financial Institutions, District Industries Centre (DIC) and Statistical Abstracts, Published Reports, Periodicals, News Papers and web-sites etc.

#### 1.5.3 Sample Design:

The present study covers all ten major artisans' categories prevailing in Kolhapur district, which includes Potter, Carpenter, Black Smith, Cobbler, Goldsmith, Shepherd, Weavers, Gavandi, Burud and Tailors. Total 480 artisans is the sample size for the study confined to 10 categories in 12 talukas of Kolhapur district. The formula for determining sample size in case of, infinite population is used to arrive at a representative number of respondents as given below: (Godden, 2004).

$$\text{Sample Size} = \frac{z^2 * P (1-P)}{M^2}$$

Where,

SS = Sample Size for infinite population (More than 50,000)

Z = Z Value (e.g. 1.96 for 95 per cent level of confidence)

P = Population Proportion (expressed as decimal) assumed to be 50 per cent i.e. 0.5

M = Margin of Error at 5 per cent (0.05).

$$\begin{aligned} \text{Sample Size} &= \frac{1.96^2 * 0.5 (1-0.5)}{0.05^2} \\ \text{Sample Size} &= \frac{3.8416 * 0.5 * 0.5}{0.0025} \\ \text{Sample Size} &= \frac{0.9604}{0.0025} \end{aligned}$$

### Sample Size = 384.16

Adequacy of sample size has been calculated by Godden, 2004 formula, which scored 384. Hence, more than adequate 480 artisans have been selected. The total sample size of 480 is comprised of 40 respondent artisans from each taluka, of which each category of artisan contributes to the sample size of 4 each.

### 1.6 ANALYSIS OF DATA:

#### 1.6.1 Data Processing:

The collected data were processed with the help of statistical tools and techniques, such as classification, editing, coding, tabulation, use of software's such as SPSS and MS-Excel.

#### 1.6.2 Data Presentation:

Data are presented in the form of various tables and charts for information relating to aspects in research such as Personal information, business information, marketing, new economic policy, business resources, income level labour intensity and aesthetic satisfaction etc.

#### 1.6.3 Data Analysis:

Data were analysed by the using statistical tools, like various tables, various graphs, and charts and with the help of simple statistical techniques such as average, percentage etc. The researcher has used one sample t-test for the purpose of testing of hypothesis.

#### 1.6.4 Data Interpretation:

Finally, researcher has interpreted the data on the basis of analysed data provided by the respondent artisans.

### 1.7 SCOPE OF THE STUDY:

#### 1.7.1 Geographical Scope of the study

The geographical scope of the present study is restricted to Kolhapur district.

#### 1.7.2 Analytical Scope of the study:

The data have been analyzed by using descriptive statistical techniques like percentage, average and presented by using tables, bar charts, pie charts formulate. The researcher has used one sample t-test for the purpose of testing of hypothesis.

### 1.7.3 Topical Scope of the study

The topical scope of the study is limited to the 'Impact of New Economic Policy on the Business of Village Artisans with special reference to Kolhapur District'.

### 1.7.4 Functional Scope

The functional scope of the study covers the role of the artisans in Indian economy, role of artisans in rural economy, it also covers the assessing impact of new economic policy on rural artisans' business.

## 1.8. ANALYSIS AND INTERPRETATION OF DATA:

Table 1

Distribution for Socio- Economic Status of Artisans

| Sr. No | Parameter      | Classification   | Frequency | Percentage |
|--------|----------------|------------------|-----------|------------|
| 1      | Age            | 21 to 30         | 13        | 2.70       |
|        |                | 31 to 40         | 66        | 13.80      |
|        |                | 41 to 50         | 144       | 30.00      |
|        |                | 51 to 60         | 224       | 46.60      |
|        |                | above 61         | 33        | 6.90       |
| 2      | Gender         | Total            | 480       | 100        |
|        |                | Female           | 29        | 6.00       |
|        |                | Male             | 451       | 94.00      |
|        |                | Total            | 480       | 100        |
| 3      | Education      | Illiterate       | 310       | 64.60      |
|        |                | Primary          | 41        | 8.50       |
|        |                | Secondary        | 75        | 15.60      |
|        |                | Higher Secondary | 52        | 10.80      |
|        |                | Graduate         | 2         | 0.40       |
| 4      | Religion       | Total            | 480       | 100        |
|        |                | Hindu            | 455       | 94.80      |
|        |                | Muslim           | 22        | 4.60       |
|        |                | Bouddh           | 3         | 0.60       |
| 5      | Category       | Total            | 480       | 100        |
|        |                | General          | 44        | 9.20       |
|        |                | OBC              | 327       | 68.10      |
|        |                | SBC              | 2         | 0.40       |
|        |                | VJNT             | 46        | 9.60       |
|        |                | SC               | 55        | 11.50      |
|        |                | ST               | 6         | 1.30       |
|        |                | Total            | 480       | 100        |
| 6      | Caste          | Potter           | 52        | 10.80      |
|        |                | Carpenter        | 65        | 13.50      |
|        |                | Lohar            | 60        | 12.50      |
|        |                | Chambhar         | 58        | 12.10      |
|        |                | Sonar            | 48        | 10.00      |
|        |                | Dhangar          | 46        | 9.60       |
|        |                | Maratha          | 40        | 8.30       |
|        |                | Shimpi           | 43        | 9.00       |
|        |                | Mang             | 13        | 2.70       |
|        |                | Burud            | 39        | 8.10       |
|        |                | Muslim           | 8         | 1.70       |
|        |                | Total            | 480       | 100        |
| 7      | Marital Status | Unmarried        | 6         | 1.30       |
|        |                | Married          | 471       | 98.10      |
|        |                | Widowed          | 3         | 0.60       |
|        |                | Total            | 480       | 100        |

Source: Field Survey

## 1.9 CLASSIFICATION OF ARTISANS ACCORDING TO VIEWS ABOUT ECONOMIC POLICY

Table 2

OPINION ABOUT IMPACT OF NEW ECONOMIC POLICY

| Sr. No | Responses                          | Yes (%)    | No (%)     | Total (%) |
|--------|------------------------------------|------------|------------|-----------|
| 1      | New economic policy affected       | 446 (92.9) | 34 (7.1)   | 480 (100) |
| 2      | Infrastructural facility           | 432 (90.0) | 48 (10.0)  | 480 (100) |
| 3      | Difficulty to get capital          | 431 (89.8) | 49 (10.2)  | 480 (100) |
| 4      | Difficulty to market the product   | 415 (86.5) | 65 (13.5)  | 480 (100) |
| 5      | Difficulty to get bread and butter | 368 (76.7) | 112 (23.3) | 480 (100) |
| 6      | Created cut-through competition    | 347 (72.3) | 133 (27.7) | 480 (100) |

Source: Field Survey

It is seen that, the economic policy implemented by Government of India in, 1991 greatly affects the business. The costs of capital, marketing, research and development, advertisement have increases and created the cut-through competition in artisan business. But, at the same time the infrastructural facilities have improved. So, artisans need to concentrate on this positive out-coming of the new economic policy. Artisans have to adapt to the changing conditions and change in business considering the present condition. The government should help artisans to cope up with changing conditions. Due to new economic policy 1991, it is also possible that the impact might be negative (Closure of business) or positive (Starting new business units). This study intends to measures both negative and positive impact of economic reforms on the business units started by the rural artisan in Kolhapur district.

### 1.10.1 HYPOTHESIS 1

1. ( $H_0$ ) There is an adverse impact of new economic policy on the business of rural artisans.

$$H_0 \mu = 3$$

$$H_1 \mu \neq 3$$

Note: Here, the basic data from Table 2 have been used for testing these hypotheses

For, '1' is taken, if response is 'Yes'

'0' has been taken, if response is 'No'

6 factors are considered for measuring impact of new economic policy on the business of rural artisans, which are (1) New Economic Policy affected, (2) Infrastructure facility, (3) Difficulty to get capital, (4) Difficulty to get market, (5) Difficult to get bread and butter, (6) Created cut-through competition etc.

Expected value for full impact is 6 hence, 50 per cent of it. i.e. 3 has been taken as test value. It means, if value is 3 equal to 3 or above 3, there is impact of new economic policy.

**Table 3**

**Analysis of one Sample T-Test For adverse Impact of NEP**

| Hypothesis   | Paired Differences |       |                 | t      | Test Value | df  | Sig.(2-tailed) | Result                   |
|--------------|--------------------|-------|-----------------|--------|------------|-----|----------------|--------------------------|
|              | Mean               | S. D. | Std. Error Mean |        |            |     |                |                          |
| Hypothesis 1 | 5.08               | 1.461 | .067            | 31.219 | 3          | 479 | 0.000          | H <sub>0</sub> -Accepted |

S. D = Standard Deviation, df = Degree of Freedom.

It is seen whether the mean value of sample difference 5.08 is significant from a population mean. The one sample t-statistic is 31.219, where the significant value is 0.000, which is less than the table value (the level of significance 0.05 with the degree of freedom 479). The null hypothesis is accepted and alternative hypotheses is rejected i.e. There is an adverse impact of new economic policy on the business of rural artisans.

**1.10.2 HYPOTHESIS 2**

2. (H<sub>0</sub>) There is no social support to artisans.

**Note:** Here, the basic data from Table 3 have been used for testing this hypothesis

For, '1' is taken, if response is 'Yes'

'0' has been taken, if response is 'No'

10 factors considered for measuring social support for artisans, which (1) Are you doing the business only because to caste, (2) Family suggestion, (3) Investing money, (4) Family suggestion of business expansion, (5) Relatives and friends, (6) Expansion of business, (7) Co-operation, (8) Inspiration of government, (9) Growth and development, (10) Inspiration of government for running the business.

Expected value for full impact is 10 hence, 50 per cent of it. i.e. 5 has been taken as test value. It means, if value is 5 equals to 5 or above 5, there is no social support for artisans.

**Table 4**

**Analysis of one Sample T-Test for No Social Support to Artisans**

| Hypothesis   | Paired Differences |       |                 | t      | Test Value | df  | Sig.(2-tailed) | Result                   |
|--------------|--------------------|-------|-----------------|--------|------------|-----|----------------|--------------------------|
|              | Mean               | S. D. | Std. Error Mean |        |            |     |                |                          |
| Hypothesis 2 | 6.59               | 1.660 | .076            | 20.920 | 5          | 479 | 0.000          | H <sub>0</sub> -Accepted |

S. D = Standard Deviation, df = Degree of Freedom.

The above table shows that the mean value of sample difference 6.59 is significant from a population mean. The one sample t-statistic is 20.920, where the significant value is 0.000. which is less than the table value. (The level of significance is 0.05, with the degree of freedom 479). The null hypothesis is accepted and alternative hypothesis is rejected. i.e. there is no social support to artisans.

**1.11 SUGGESTIONS:**

1. Government should help to artisans by giving the loans at lower rate of interest to improve their business.
2. Awards, prizes and Certificates should be given to those artisans who produce maximum and quality products and to those who are having frequent publications of various posters, booklets, write ups in leading news-papers, columns related to artisans products in local as well as domestic news-papers to encourage them.
3. It is a necessary to develop, encourage and register a specific brand of artisan's product such as 'Kolhapuri Chappal' by fixing geographical indication (GI) and promote it for domestic as well as international market accessibility.
4. In order to inspire the village artisans, they should be provided training at local level. For that purpose, the training programmes, workshops, conferences and seminars should be arranged in frequently through trainings institutions such as KVIB, MKVIB etc.
5. To avoid malpractices and corruption in the distribution of subsidies by the central and state government, the government should provide financial assistance to village artisans immediately with simple process of loan sanction.

6. For the development of artisans, the related websites should be updated regularly with new information and coherent statistical database.
7. In order to attract foreign tourists and understand their needs and expectations to serve them better, artisans should develop a good relationship with the tourists.
8. Village artisan should give up their regular livelihood "attitude" towards their business. They should be flexible enough to cope with changing business activities in this global era, and they should apply advanced production and modern technology, marketing techniques to enhance the quality of their products.
9. Village artisans should keep on updating knowledge and skills as well as they should enhance their competencies with the help of formal training.
10. Special events like training programmes, workshops seminars etc, are to be arranged frequently in collaboration with ITI's and local Universities, at district level as well as taluka level for enhancing level for enhancing their skill competencies and their existing knowledge with regards to production, marketing, finance and human resource management etc.
11. Adequate and timely guidance should be provided to artisan through separate mechanism for effective marketing of their products with prior declaration of minimum support price.

#### CONCLUSION:

In conclusion, the NEP had a negative impact on rural artisans' businesses due to the shift in the market's structure towards large corporations. The competition, industry concentration, and shift in production led to a decline in rural artisans' market share, reduced profits, and increased unemployment. The introduction of new technology and the promotion of export-oriented businesses were beyond the reach of rural artisans, further reducing their competitiveness. Thus, the government must take initiatives to address the issues faced by rural artisans, such as providing financial and techni-

cal assistance, market support, and promoting their products.

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## A study of Digital Banking and financial services in Rural Area

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**Abstract:** Digital banking has emerged as a potent investment instrument in India, particularly in rural areas. This sector is growing excitingly in 2024 as India's economy continues to expand, but it still faces significant obstacles. This research paper attempts to study and examines the development, challenges, and promising future possibilities of digital banking in rural India.

The developing nations could benefit greatly from a variety of affordable, suitable, and safe banking services offered by digital financial services. It makes financial services accessible to unbanked people via digital technologies; however, has a lot of obstacles to adoption. The present research is attempts to examines the advancements in Digital Banking services, Prospects for digital banking, the reasons for using digital payments and problems faced in digital banking with concluding remarks.

**Introduction:** While providing financial services, digital financial services made possible by banks and have the potential to save expenses while boosting revenues, security, speed, and transparency. Additionally, it offers more specialized financial services that have a broad positive impact on the impoverished. Through digital technologies, it enables those without bank accounts to become used to financial services. However, a lot of people are either ignorant of digital financial services or have not embraced it as a financial tool that might help these rural residents. Digital media provides access to and delivery of financial ser-

vices, including credit, savings, insurance, and payments. In this context, "digital channels" include the internet, mobile phones (including smartphones and digital feature phones), ATMs, POS terminals, NFC-enabled devices, chips, electronically enabled cards, biometric devices, tablets, and any other digital system. Innovation, work convenience, new job opportunities, and rural growth are all enhanced by digitalization. Digitalization speeds up the customer's money transfer procedure with various services including online payment of monthly expenses like electricity bills, premium payments, and so on. digitalization speeds up the process of sending or receiving money for the customer.

Basic mobile payment systems are estimated to have connected over millions of people, enabling them to transmit money, pay bills, or buy prepaid electricity more easily, affordably, and globally. In order to increase the efficiency of service charge collection and provide social safety net cash payments, governments are adopting digital finance more and more. Digital financial services, on the other hand, have greater potential to boost economic growth for rural residents.

The goal of the "Digital India" initiative is to transform society into one that is empowered by technology. The Bharat Net Project was also adopted by the nation. The Indian government's efforts to expand e-banking, e-governance, e-education, and rural internet connectivity

### Objectives of the study

1. To study the Advancements in Digital Banking and Prospects in the future:
2. To take the review of the reasons for using digital payments
3. To study the problems faced in digital banking.
4. To study the awareness of digital banking and financial services in rural areas

**Methodology Adopted:** The present research based on primary as well as secondary data. Primary data was collected from 100 respondents by questionnaire method. The questions which were asked in the survey consists of data related to rate of people using internet, accessing bank account, people who knows digital fi-

financial services, literacy of people with respect to digital financial services. Secondary data was collected from the books, journal and periodicals.

**Sample Design:** Survey method was used for collecting data regarding digital banking and financial services.

**Scope of the study:** The scope is limited to the 7 villages located in the central part of the Sangli district.

#### Developments in Digital Banking:

**1. Government Initiatives:** The advancement of digital banking in India has been greatly aided by the government's steadfast dedication to the cause. The goal of initiatives like Bharat Net and Digital India is to increase digital literacy and internet connectivity in rural areas. According to the Reserve Bank of India's (RBI) 2023 forecast, there will be a notable surge in internet users in rural regions, which will make it easier for people to use digital banking services.

**2. Mobile Banking Revolution:** By removing the need for lengthy treks to bank branches, mobile banking has completely transformed digital banking in rural India. Rural residents can now quickly access their accounts, send money, and pay their bills thanks to user-friendly apps available in their native tongues. Mobile banking transactions in rural India have increased by more than 200% over the last three years.

**3. Fitch Partnerships:** Traditional banks and fetch (financial technology) companies are increasingly collaborating in digital banking. To precisely address the needs of the rural population, fetch entrepreneurs are creating cutting-edge solutions such as microloans, micro insurance, and USSD (Unstructured Supplementary Service Data) based banking for feature phones.

**4. Emphasis on Financial Literacy:** A number of parties are launching campaigns in recognition of the significance of financial literacy for the effective use of digital banking services. Rural populations are educated by these initiatives on subjects including fraud detection, smart banking habits, and making the most of modern financial instruments:

**Prospects for digital banking in rural area in the future:**

Digital banking in rural India has a bright

future. Here are some important things to keep an eye on:

**1. Offline to Online Integration:** The digital divide can be closed by using a hybrid approach that blends online and offline financial methods, such as postal banking.

**2. Artificial Intelligence (AI) and large Data:** By utilizing AI and large data collecting, rural clients can receive personalized financial products and services and streamline their digital banking experience.

**3. Emphasis on local languages:** Providing digital banking services and customer service in local languages would boost user confidence and accessibility.

**4. Block chain Technology:** By enhancing the security and transparency of digital transactions, block chain technology adoption can address cyber security issues in rural areas.

#### Analysis of Data:

In this part the researcher has collected data from the respondents through well structured questionnaire. Some of the part was highlighted in following table:

**Table no. 1 Responses regarding digital financial services**

| Sr. No. | Particulars                        | Responses           | Frequency | %   |
|---------|------------------------------------|---------------------|-----------|-----|
| 1       | Age                                | Up to 25            | 27        | 27  |
|         |                                    | 26 to 35            | 30        | 30  |
|         |                                    | 36 to 45            | 26        | 26  |
|         |                                    | Above 45            | 17        | 17  |
|         |                                    |                     | 100       | 100 |
| 2       | Education                          | SSc                 | 15        | 15  |
|         |                                    | HSC                 | 19        | 19  |
|         |                                    | Graduate            | 39        | 39  |
|         |                                    | Post graduate       | 23        | 23  |
|         |                                    | Any other           | 4         | 4   |
| 3       | Occupation                         |                     | 100       | 100 |
|         |                                    | Service             | 59        | 59  |
|         |                                    | Business            | 24        | 24  |
|         |                                    | Any other           | 17        | 17  |
|         |                                    |                     | 100       | 100 |
| 4       | Monthly income                     | Up to 15,000        | 29        | 29  |
|         |                                    | 15 to 25,000        | 50        | 50  |
|         |                                    | 25000 and above     | 21        | 21  |
|         |                                    |                     | 100       | 100 |
|         |                                    |                     |           |     |
| 5       | Method of payment                  | ATM                 | 42        | 42  |
|         |                                    | Credit card         | 10        | 10  |
|         |                                    | Debit card          | 19        | 19  |
|         |                                    | Net banking         | 19        | 19  |
|         |                                    | Mobile wallets      | 10        | 10  |
|         |                                    | Other               | 0         | 0   |
|         |                                    |                     | 100       | 100 |
| 6       | Reasons for using digital payments |                     |           |     |
|         |                                    | Easy access         | 22        | 22  |
|         |                                    | Convenient          | 37        | 37  |
|         |                                    | Low cost            | 27        | 27  |
|         |                                    | Security            | 12        | 12  |
|         |                                    | Any other           | 2         | 2   |
| 7       | Problems faced by respondents      |                     | 100       | 100 |
|         |                                    | Lack of security    | 59        | 59  |
|         |                                    | Lack of knowledge   | 10        | 10  |
|         |                                    | Fear of cyber crime | 31        | 31  |
|         |                                    | Any other           | 0         | 0   |
|         |                                    |                     | 100       | 100 |

The above table shows the classification of the respondents on the basis of age, educational qualification, income, method of payment adopted for digital banking service, Problems faced by respondents and Reasons for using digital payment system. The questions which were asked in the survey consists of data related to people using internet, accessing bank account, people who knows digital financial services, literacy of people with respect to digital financial services.

#### Findings:

1. It has been observed that maximum numbers of respondents are between the age group of 26 to 35 i.e. 30%.
2. The highest numbers of respondents i.e. 39% are graduates in the study area.
3. 59% of the respondents engaged in service sector.
4. It has been noted that 50% of the respondents having monthly income of Rs. 15,000 to 25,000
5. Highest number of respondents in the study area use ATM service as a popular service in digital banking.
6. It has been observed that, 37% of the respondents use these digital banking and financial services because these services are convenient to them.
7. It has been observed that, 59% of the respondents faced the problem of lack of security which is one of the basic threat in the digital financial service.
8. It has been discovered that 68% of rural families use Digital Financial Services.
9. According to the findings, total awareness of digital financial services among rural households is rather low (38 percent people were expressed their neutrality towards the complete awareness about digital financial services.
10. According to the studies of the survey, just 12% of rural households use digital services on a permanent basis
11. Another significant result in the study is

that Cash on Delivery is the most favourable method of payment when compared to other modes of payment.

12. It has been discovered that the primary objective of digital financial services among rural households is cash withdrawal. Utility payments, such as energy bills, are a less desired reason.

**Conclusion:** In rural area, digital banking has the potential to revolutionize investment and provide rural communities more influence. The future of digital banking will be smoothly incorporated into individuals' daily lives by tackling the present issues with the cooperation of governments, banks, fetch firms, and non-governmental organizations. The prevalence of rural areas is rising. This will necessitate ongoing investment in enhancing financial literacy, constructing robust digital infrastructure, and guaranteeing the security of online transactions. For rural India, digital banking has the promise of truly bridging the gap and ushering in a new era of financial empowerment. The study concludes that there is a lack of awareness among rural areas. The importance of digital financial services is yet to be circulated over the boundaries. There is a great impact of DFS in the current century as it makes the work easier and more convenient. The infrastructure needs to be updated time to time to get better output from rural areas. Rural people have a fear of security because they are more confined to their zone and this is the major concern. In rural area too, people don't look over cost, they prefer quality services.

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## The Study of Role of Women in Dairy Industry in Kadegaon Tehsil

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### Abstract-

In India Women entrepreneurs play an important role, particularly in Dairy industry. Women Entrepreneurs help to develop the dairy industry. This study was conducted in Kadepur city (Sangli District). The objective of the study is to find out the satisfaction level of women in dairy Industry. The survey research method was applied for the purpose of collecting primary data. The sample size was taken 50 women dairy farmers in Kadepur city. A structured questionnaire was used for the data collection. The collected data were tabulated for a clear understanding. The analysis was done using statistical tools like average and simple percentage. This study was conducted for analyzing the satisfaction level of women in dairy sector. Women were satisfied with Family support and business profit; family members were giving good guidance to the women entrepreneurs.

**Key words:** - Women entrepreneurs, Dairy

### 1.1 Introduction-

Instead of the seasonal income provided by crops, a dairy enterprise, once established or improved, can supply milk that is sold weekly or even daily for cash. In the vast majority of cases that cash goes to the women of the household furthermore research down the years has shown that money earned by women goes directly to support the family, paying for food, education and medicine. In India women's involvement in livestock management is a longstanding tradition and dairy farming has

been an integral part of homestead farming system. The employment of women is an index of their economic and social status in society. In India, women constitute 90 per cent of marginal workers, with some regional variations. The Operation Flood (OF) program recognizes that,

- Dairying at the household level is largely the domain of women
- The products and income from dairying can be controlled by women
- Dairying can be practiced on a small scale.
- Dairying helps to meet day today requirements.
- The Dairy products widely used across india

### 1.2 Objectives of the study

1. To study the profile of women dairy farmers
2. To analyze the satisfaction level of women.
3. To analyze the family support and business profit to women entrepreneurs in dairy industry.
4. To examine if dairy income has led to the empowerment of women.

### 1.3 Research Methodology

This paper is based mainly on primary and secondary data. Primary data is collected through questionnaire and Secondary data is collected from books, magazines, newspapers & various websites.

### Selection of sample-

The present study was conducted in Kadepur, where dairy farming is one of the major sources of wage earning. 50 women were randomly selected from the study area. The data were collected personally with the help of structured pre-tested interview schedule. The data were analyzed with the help of frequency, percentages.

### 1.4 Limitations of the study –

1. The study is covering women entrepreneurs in dairy sector only.
2. The study was made on the basis of questionnaire survey, so limitations of questionnaire

may creep in the study.

### 1.5 Data collection & analysis

**Table No.1.5.1- Table showing profile of the Respondents** N=50

| Factors                          | No of Respondents | percentages |
|----------------------------------|-------------------|-------------|
| <b>Age</b>                       |                   |             |
| 20-35                            | 15                | 30%         |
| 35-50                            | 15                | 30%         |
| Above 50                         | 20                | 40%         |
| <b>Educational Qualification</b> |                   |             |
| Uneducated                       | 20                | 40%         |
| Secondary                        | 20                | 40%         |
| Higher secondary                 | 05                | 10%         |
| Graduation                       | 05                | 10%         |
| <b>Monthly income level</b>      |                   |             |
| Below 5000                       | 20                | 40%         |
| 5001-10000                       | 20                | 40%         |
| 10001-15000                      | 05                | 10%         |
| Above 15000                      | 05                | 10%         |
| <b>Type of family</b>            |                   |             |
| Nuclear                          | 35                | 70%         |
| Joint                            | 15                | 30%         |

Source- based on data collected from respondents

Table no.1.5.1 shows that, 40% women respondents are above the age of 50 & 40% are uneducated and 40% have a secondary education. 40% of the women respondents have income below Rs. 5000 and 40% respondents have income between Rs. 5001-10000.

**Table No.1.5.2- Table showing satisfaction from rate received for milk**

| Particulars         | No of Respondents | Percentages |
|---------------------|-------------------|-------------|
| Dairy co-operative  | 35                | 70%         |
| Direct to consumers | 15                | 30%         |

Source- based on data collected from respondents

Table no. 1.5.2 shows that, 70% of the women respondents sell milk to dairy Co-operatives & only 30% sell directly to consumers.

**Table No.1.5.3- Table showing satisfaction from rate received for milk**

| Particulars | No of Respondents | Percentages |
|-------------|-------------------|-------------|
| Yes         | 30                | 60%         |
| No          | 20                | 40%         |

Source- based on data collected from respondents

Table no. 1.5.3 shows that, 60% women respondents are satisfied with rate received for milk and 40% are not satisfied with rate received

for milk.

**Table No.1.5.4 Table showing satisfaction level from Business Profit**

| Particulars | No of Respondents | Percentages |
|-------------|-------------------|-------------|
| Yes         | 30                | 60%         |
| No          | 20                | 40%         |

Source- based on data collected from respondents

Table no. 1.5.4 shows that, 60% of the women respondents are satisfied with the business profit.

**Table No.1.5.5- Table showing business profit allocated for kind of expenditure**

| Particulars          | No of Respondents | Percentages |
|----------------------|-------------------|-------------|
| Family Expenditure   | 25                | 50%         |
| Business development | 05                | 10%         |
| Savings              | 05                | 10%         |
| All of the above     | 15                | 30%         |

Source- based on data collected from respondents

Table no.1.5.5 shows that, 50% of the women respondents expend their income on family expenditure and 30% of the respondents expend on family expenditure, business development and savings.

**Table No.1.5.6- Table showing support from family members in this business**

| Particulars | No of Respondents | Percentages |
|-------------|-------------------|-------------|
| Yes         | 40                | 80%         |
| No          | 10                | 20%         |

Source- based on data collected from respondents

Table no. 1.5.6 shows that, 80% of the women respondents receive support from family members.

### 1.6 Findings of the Study-

It is observed that,

1. More than 40% of respondents were above the age of 50 years.
2. Majority of the respondents had monthly income less than Rs.10000 and majority of them were satisfied with family support, business profits and rate received for milk. Majority of them had a nuclear family.
3. It was found that, out of 50 respondent's 70%

were selling their milk to dairy co-operatives.

4. Further the study revealed that 60% of the respondents were doing as fulltime.

5. Most of the respondents were allocated business profits for family expenditure. Family members were giving good guidance to the women entrepreneurs.

6. More than 80% of the respondents likes to encourage do the same business to others.

7. It is observed that More than 50% of respondents think that the Profit allocated for kind of expenditure is used for family expenditure.

### 1.7 conclusions and suggestions-

It is concluded that, India has enormous potential for entrepreneurship development in terms of diversity of rural occupations. Livestock production is one of the promising sectors of entrepreneurship development in India. Development of entrepreneurship ensures optimal utilization of resources and facilities and value to product and services. The study revealed that women entrepreneurs were satisfied with family support and business profit; family members were giving good guidance to the women entrepreneurs. So all type of family may support and encourage the women entrepreneurs, and then only they could reach their goal. Dairy is subsidiary level of income for all the families.

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## Digital Payment Innovation in the Bancassurance Channel

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### Abstract

Innovations in digital payments have had a big impact on the bancassurance concept, which combines banking and insurance services. The processing of insurance premiums, claims, and other financial transactions has changed as a result of technological developments such as contactless transactions, blockchain, open banking, mobile payments, and artificial intelligence. This study investigates which innovations available in digital payments and how they benefited to bancassurance. The results show that although advancements in digital payments have increased transaction speed, security, and accessibility, problems including cybersecurity risks, a lack of digital literacy, and inconsistent regulations still exist. Recommendations for financial institutions to maximize digital payment infrastructure in bancassurance are included in the study's conclusion.

**Keywords:** Digital Payments, Bancassurance, ....

### 1. Introduction

The strategic alliance between banks and insurance providers, known as bancassurance, has changed quickly as a result of developments in online financial services. Bancassurance's efficiency and reach were for-

merly constrained by its reliance on manual paperwork, in-person banking transactions, and conventional payment methods. However, the industry has undergone a transformation thanks to the emergence of digital payment innovations, which make it possible to pay insurance premiums easily, issue policies instantly, and resolve claims quickly.

Artificial intelligence (AI), blockchain, mobile wallets, real-time payment systems, and open banking have all been integrated to improve consumer satisfaction and operational efficiency. Notwithstanding the benefits, obstacles like cybersecurity risks, problems with regulatory compliance, and the digital divide continue to be major obstacles to broad adoption. This study looks which innovations available in digital payments and how they benefited to bancassurance.

## 2. Objectives of the Study

1. To study digital payment innovations available in bancassurance.
2. To study digital payment innovations' benefits to bancassurance.

## 3. Research Methodology

This study is qualitative research which focused on existing study in same field. This study based on Secondary Data which includes academic journals, research papers and websites information.

## 4. Digital Payment Innovations in Bancassurance

**1. Mobile wallets** (Google Pay, PhonePe, Paytm, Amazon pay etc.)

It is a smartphone program that lets users manage financial services, store money, and conduct transactions. By acting as virtual bank accounts, mobile wallets allow users to make purchases, pay bills, and carry out financial operations without requiring cash or actual credit cards.

### Benefits to Bancassurance :

1. Improve the Convenience of Customers 2) A Higher Rate of Insurance Intake 3) Secure and

quick transactions 2. Banks' and insurers' cost effectiveness 5) Tailored Products using Data Analytics 6) Smooth Settlement of Claims 7) Embedded Insurance Promotion 8) Awareness and Inclusion in Finance

**2. Mobile banking apps** (SBI YONO, iMobile Pay, BOB World etc.)

Customers can conduct financial transactions, manage their accounts, and access a range of banking services from their smartphones with the use of mobile banking apps, which are digital platforms offered by banks. Users can pay bills, ask for loans, check balances, transfer money and even buy insurance products with these apps.

### Benefits to Bancassurance :

1. Easy Access to Insurance 2) Immediate Premium Renewals and Payments 3) Improved Access to Finance 4) Tailored Insurance Products 5) Processing Claims Quickly and Securely 6) Financial Gains for Banks and Insurance Companies 7) Embedded Insurance Promotion 8) Increased Client Loyalty and Engagement

## 3. Blockchain

It is a distributed ledger technology that securely and openly records transactions across numerous computers. Every transaction is kept in a block and after it has been validated, it is added to a series of earlier transactions to create an unchangeable record.

### Benefits to Bancassurance :

- 1) Risk mitigation and fraud prevention 2) Processing Claims More Quickly and Openly 3) Better Privacy and Data Security 4) Effective Policy Management and Issuance 5. Improved Experience for Customers 6) Compliance with Regulations and Auditability 7) Lowering Bank and Insurance Costs 8) Improved Cooperation Between Banks and Insurance Companies

## 4. Smart Contracts

It is a digital contract that runs on its own and is kept on a blockchain. It has pre established regulations and in the absence of middlemen, automatically completes transac-

tions when certain requirements are satisfied.

#### **Benefits to Bancassurance :**

1) Automated and expedited processing of claims 2) Preventing Fraud and Improving Security 3) Lowering Bank and Insurance Costs 4) Increased Trust and Transparency 5) Effective Policy Issue and Renewal 6) Compliance with Regulations and Auditability 7) Personalization and Customization 8) Improved Experience for Customers

#### **5. Artificial Intelligence and Machine Learning in Digital Payments**

Computer programs that are capable of making decisions, solving problems, and learning from data are referred to as artificial intelligence (AI) systems. In a number of sectors, including banking and insurance, artificial intelligence (AI) makes automation, predictive analysis and personalization possible.

A branch of artificial intelligence called Machine Learning (ML) enables computers to learn from data and enhance their functionality without the need for explicit programming. It's algorithms improve decision making in risk assessment, fraud detection and customer service by analyzing patterns, generating predictions and adapting in response to fresh data.

#### **Benefits to Bancassurance :**

1) Improved Personalization and Customer Experience 2) Automated Risk Assessment and Underwriting 3) Fraud Identification and Avoidance 4) Processing Claims More Quickly and Accurately 5) Using Predictive Analytics to Keep Customers 6) Operational Efficiency and Cost Reduction 7) Compliance and Risk Management on a Regular Basis 8) Opportunities for Cross-Selling and Upselling

#### **6. Open Banking**

A financial system called Open Banking enables banks to safely send client financial information to third party providers through Application Programming Interfaces. Fintech firms, insurers and other financial institutions can now provide new and individualized financial ser-

vices, including insurance products under the bancassurance.

#### **Benefits to Bancassurance :**

1) Improved Personalization and Customer Experience 2) Simplified and Quicker Policy Issue 3) Financial Gains for Banks and Insurance Companies 4) Greater Adoption of Insurance 5) Smooth Settlement and Processing of Claims 6) Data-Informed Risk Evaluation and Costing 7) Security and Regulatory Compliance 8) Opportunities for Cross-Selling and Upselling

#### **7. API Integration**

A collection of tools and protocols known as an Application Programming Interface (API) enables communication across various software systems. APIs facilitate safe data sharing and service automation in the financial and insurance industries by enabling smooth integration between banks, insurers and third party providers.

#### **Benefits to Bancassurance :**

1) Seamless Integration of Banking and Insurance Services 2) Faster and Automated Insurance Policy Issuance 3) Enhanced Customer Experience and Personalization 4) Faster and Secure Claims Processing 5) Cost Reduction and Operational Efficiency 6) Fraud Prevention and Risk Management 7) Compliance and Regulatory Benefits 8) Cross Selling and Revenue Growth

#### **8. NFC (Near Field Communication)**

When devices are positioned close to one another (often within 4cm), a short-range wireless technology called near field communication (NFC) allows them to communicate. Data transfer, identification verification and contactless payments are among its frequent uses.

#### **Benefits to Bancassurance :**

1. Faster and Contactless Insurance Premium Payments 2) Seamless Customer Authentication and KYC 3) Instant Policy Issuance and Verification 4) Faster and Secure Claims Processing 5) Enhanced Customer Experience 6) Improved

Security and Fraud Prevention 7) Streamlined Cross-Selling and Upselling Opportunities

### 9. Biometric authentication (fingerprint and facial recognition)

Using distinctive biological characteristics like fingerprints, facial recognition, voice patterns or iris scans, biometric authentication is a security procedure that confirms an individual's identification. By guaranteeing that only authorized individuals have access to sensitive financial and insurance services, it improves security.

#### Benefits to Bancassurance :

1) Enhanced Security and Fraud Prevention  
2) Faster and Seamless Customer Onboarding  
3) Secure and Convenient Insurance Payments  
4) Instant and Secure Claims Processing  
5) Improved Customer Experience  
6) Regulatory Compliance and Risk Management  
7) Cost Savings and Operational Efficiency  
8) Multi Channel Access and Remote Authentication

### 5. Findings and Discussion

1. Access to bancassurance has increased because to digital payment alternatives, especially in developing nations.  
2. Underprivileged communities now have better access to financial services thanks to microinsurance products made possible by mobile payments.  
3. Automated policy renewals and instant payment processing increase client retention rates.  
4. Personalized recommendations powered by AI increase consumer interaction with bancassurance products.  
5. Administrative expenses and human mistake are decreased by automated payment processing.  
6. AI-based fraud detection and underwriting reduce risks and improve transaction security.  
7. Digital bancassurance transactions are at risk from growing cyberthreats including phishing attempts and data breaches.  
8. For safe transactions, multi-factor authentication and encryption technology implementa-

tion are still essential.

9. Global bancassurance businesses have compliance problems due to disparate regulatory frameworks across different regions.

10. For sustainable growth, laws pertaining to digital payments and data protection must be strengthened.

### 6. Suggestions and Recommendations

1. AI-driven fraud detection systems, biometric authentication, and strong encryption must be put in place by banks and insurers.  
2. To reduce the risk of fraud, staff and clients should receive regular cybersecurity training.  
3. Starting educational initiatives to raise awareness of digital payments in bancassurance.  
4. Offering bancassurance agents training courses on digital payment systems.  
5. For bancassurance, governments and financial regulators ought to create standardized rules for digital payments.  
6. Improving digital payment Know Your Customer (KYC) and Anti-Money Laundering (AML) protocols.  
7. Investing in the growth of mobile banking and reasonably priced internet access to broaden the reach of bancassurance.  
8. Promotion of QR code and UPI-based payment methods to assist low-income customers.  
9. Promoting partnerships based on APIs to create smooth digital payment systems for bancassurance.

### 7. Conclusion

Innovations in digital payments have greatly improved transaction security, accessibility, and efficiency, revolutionizing bancassurance. Premium collecting, policy management, and claims processing have been made easier by mobile banking, blockchain, AI-driven payments, and open banking. However, obstacles including the inconsistent regulations, and cybersecurity dangers still prevent widespread implementation. The bancassurance sector may optimize the advantages of digital payment technologies, guaranteeing increased fi-

financial inclusion and sustainable growth, by strengthening security measures, improving financial literacy, and encouraging regulatory uniformity.

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## Role of UPI in Digital Payment System

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### ABSTRACT

The Unified Payments Interface (UPI) is a digital payment architecture rolled out by National Payments Corporation of India (NPCI) using advanced digital payments features with mobile phones as the main device. The objectives of this study is to The RBI along with the NPCI has made commendable efforts to spread digital payments culture. the researcher has studied that the to know the awareness of UPI digital Payment and Understand the used of UPI digital payment. To Known the safety precautions taken by professor for using UPI Payment. The researchers have collected required information and data from karmveer Bhaurao Patil College Professors. the UPI is that it satisfies several criteria put forwarded by RBI payment system vision of safe, efficient, interoperable, authorized, accessible, inclusive and compliant with international standards. Due to demonetization and Corona pandemic, majority of the people are using cashless transactions. The primary data is collected through questionnaire, discussion, interviews, observation and necessary field work for All Permanent Teachers. UPI has made digital transaction for individuals as easy as sending money. This will bring enormous efficiency in the system and help India become a truly cashless economy.

**KEYWORDS:** UPI, NPCL Satisfaction, Technology, Digital payment system.

## 1. INTRODUCTION

Introduction of UPI has helped the digital payments landscape to evolve promoting growth and innovation in the industry. UPI's overall importance came from the intense desire and effort made by the RBI and the government to create a cost effective, simple and safe digital payments system that will be used for the large population of the country. The RBI along with the NPCI has made commendable efforts to spread digital payments culture. Digital transactions are increasing significantly in the current economic environment.

In India, the number of cashless transactions has increased significantly due to UPI (Unified Payments Interface). Through mobile devices, users may instantly transfer money between bank accounts due to the UPI real-time payment system. Since being launched in 2016 by the National Payments Corporation of India (NPCI), it has been incredibly well-liked among Indians. The total amount of UPI transactions in FY 2024 is approximately 172 billion transactions, representing a significant increase of around 46% compared to the previous year. Unified Payments Interfaced (UPI)

The pilot launch was on 11th April 2016 by Dr. Raghuram G. Rajana, Governor, RBI at Mumbai. Bank have started to upload their UPI enable apps on google play store from 25th AUGUST 2016 onwards.

As per of July 2021, UPI registered 43.25 crore (432.5 million) transactions that accounted for rs 56,734.5 core with highest average daily transaction of approximately 10 core (100 million) that is double the amount from July 2020. till august 2021, UPI FORMS 10% OF ALL retail payments in india.

According to the NPCI, "Unified Payments Interface (UPI) IS A System that powers multiple bank accounts into a single mobile application, merging several banking features, seamless fund routing & merchant payments into one hood. UPI's overall importance came

from the intense desire and effort made by the RBI and the government to create a cost effective, simple and safe digital payments system that will be used for the large population of the country. The RBI along with the NPCI has made commendable efforts to spread digital payments culture. According to the RBI, a digital payments platform should be simple, safe and efficient while carrying out payments. Various criteria about an ideal payments system was bought out by the RBI in its vision for a future payment system dreaming a digital transaction economy. From this angle, a remarkable future of the UPI is that it satisfies several criteria put forwarded by RBI payment system vision of safe, efficient, interoperable, authorized, accessible, inclusive and compliant with international standards.

## 2. NEED FOR THE STUDY

This report studies Unified Payment Interface (UPI) A new age Payment System Introduced in india by National Payment Corporation of india by National Payment Corporation of India. UPI IS A MOBILE BASED, real time inter bank payment system which has the potential to universalize digital payments in india.

(UPI) means simplified e-banking and online payments system. It allows you to transfer fund instantly via your mobile phone. You can use it for multiple purposes, including paying your utility bills or paying at local grocery shop. You do not need to carry cash as the UPI system doubles like your digital wallet.

## 3. OBJECTIVES OF STUDY

1. To know the awareness of UPI digital Payment.
2. To Understand the used of UPI digital payment.
3. To Known the safety precautions taken by professor for using UPI Payment.

## 4. REVIEW OF LITERATURE

**1. Bijin Philip (2019):** Made a study on impact of UPI on Customer Satisfaction.

The study focused on to identify the customer preference towards Unified Payment in-

terface and analyse the impact of UPI services on satisfaction of the customers.

**2. Amit Kumar Pandey and Vipul Jain (2021)** analyses the impact of UPI on digital financial inclusion in India. The study finds that UPI has made digital payments more accessible and convenient for a wide range of consumers, which has contributed to the growth of digital financial services in India.

## 5. RESEARCH METHODOLOGY

The study adopts the descriptive research design. The current study is descriptive in nature and is based on Primary data and secondary data. The primary data is collected from the Karmveer bhaurao patil college urun Islampur. There are 35 permanent teaching faculties in the college. So, researcher have selected as all permanent teaching faculties of the Karmaveer Bahurao Patil College, Urun Islampur. The data collection method which is used in this research is questionnaire. Here the data are systematically recorded from the respondents. 100% samples are selected for the study. The Secondary data are those which have already existed and The main sources of Secondary data are websites, articles, journals and Annual Report of the Reserve Bank of India published on its official website. The sample size of the study includes about 30 respondents.

## 6. DATA ANALYSIS & INTERPRETATION

A study was conducted to compare the performance of UPI transactions with K.B.P College Professors. The data analyses the K.B.P college Islampur professors are UPI used and safety and others informed that the UPI use in the digital payments.

**Table No.1 Frequency distribution of demographic profile of Professor**

| Gender        | Frequency | Percentage  |
|---------------|-----------|-------------|
| Male          | 28        | 78%         |
| Female        | 07        | 22%         |
| <b>Total</b>  | <b>35</b> | <b>100%</b> |
| Merital Satus |           |             |
| Married       | 32        | 90%         |
| Unmarried     | 3         | 10%         |
| <b>Total</b>  | <b>35</b> | <b>100%</b> |

(Source: Field Survey)

Table No. 1 shows the demographic profile of the respondents. It includes gender and merital status. It is clearly shows that 78% of the respondents are male and 22% of the respondents are female. It means that there is male persons are high than female members. And the merital status life. From the above table it is observe that in the survey 90 percent are married and 10 percentage are unmarried.

**Table No.2 Gross Salary of the Respondents**

| Gross Salary     | Frequency | Percentage  |
|------------------|-----------|-------------|
| 0-1,00,000       | 15        | 42%         |
| 1,00,000-200000  | 11        | 32%         |
| 2,00,000-300000  | 7         | 21%         |
| More than 300000 | 2         | 5%          |
| <b>Total</b>     | <b>35</b> | <b>100%</b> |

(Source: Field Survey)

In this table there are gross salary of the respondence. They are respondence are the permanat teachers faculty members. 32 percentages of respondence are 100000 to 1,50,000 salaries, 5% of respondence salry are more than 300000. It means that the maximum respondence are to the salary above 100000. researcher has observe that the are doctorate the income of professors is good. Only 5% respondence are the more than 300000.

**Table No. 3 Do you use digital payments**

| Particular   | Frequency | Percentage  |
|--------------|-----------|-------------|
| Yes          | 31        | 97%         |
| No           | 1         | 3%          |
| <b>Total</b> | <b>34</b> | <b>100%</b> |

(Source: Field Survey)

The above data collected from use of digital payments. Researcher has observe that the 31% respondence are use digital marketing. Only one respondence are not use digital payment. Unified Payments Interface (UPI) being the most prominent method, significantly reducing reliance on cash and promoting a cashless economy. It means that only one respondence are not use the UPI Payment. Respondace told

that the not for use and not believe this payment. Only use the cash not more than source is used, it means older agers are not use to this source.

**Table No.4 Use to Make Digital Payments**

| Use of App   | Frequency | Percentage  |
|--------------|-----------|-------------|
| Google pay   | 15        | 42%         |
| Phone pay    | 14        | 42%         |
| Paytm        | 2         | 6%          |
| Bhim Pay     | 2         | 6%          |
| AmazonPay    | 1         | 4%          |
| <b>Total</b> | <b>34</b> | <b>100%</b> |

(Source: Field Survey)

The table no. 4 shows the use digital payments in various aaps. 42% repondace are google pay and phone pay two apps are maximum use this digital payment.6 % percent respondence are paytm and bhim pay use the digital payment. Only one respondence are use amazon pay. google pay payment are varius product, shopping, fees, business, personal etc. Researchers has observed that some of the respondents are using more than one UPI App.

**Table No.5 UPI apps mostly used**

| Transactions     | Frequency | Percentage  |
|------------------|-----------|-------------|
| Receipt          | 1         | 3%          |
| Payment          | 8         | 24%         |
| Receipt &Payment | 25        | 73%         |
| <b>Total</b>     | <b>34</b> | <b>100%</b> |

(Source: Field Survey)

Frome the above table are UPI apps mostly use in 73% respondence are Receipt & Payments transactions maximum used. 24% percent respondence are Payment used and 3% persons Receipt used only. All Professors are used UPI payment Options. Thus it is clear that UPI uses apps. More than the use of UPI Payments are use for the shopping and payment for the petrol, grocery bills etc. receipt and Payment are use this UPI, transaction and receipt source at the others person collect the rupees.

**Table No.6 How do you make payment**

| Payments     | Frequency | Percentage  |
|--------------|-----------|-------------|
| Phone Number | 14        | 42%         |
| QR Code      | 13        | 37%         |
| UPI ID       | 5         | 15%         |
| Other        | 2         | 6%          |
| <b>Total</b> | <b>34</b> | <b>100%</b> |

(Source: Field Survey)

In this table shows that do you make payment option. Researcher has 42% percent are used payment phone Number. 37% are used QR code, UPI id used are 15% and 6% are used. Various criteria about an ideal payments system was bought. Respondance told that the maximum use of UPI is a Phone numbers transfer the payments are receipts, because payment persons are immediate feedback to the massage the payment receipts and payment. So use the QR codes are the respondence are the tea time. And the other source at the scratch card and debit and credit cards.

**Table No.7 How often do you use payment in a month**

| Times        | Frequency | Percentage  |
|--------------|-----------|-------------|
| 0-10         | 0         | 0%          |
| 10-20        | 2         | 6%          |
| 20-30        | 9         | 27%         |
| 30-40        | 11        | 36%         |
| 40-50        | 10        | 31%         |
| <b>Total</b> | <b>34</b> | <b>100%</b> |

(Source: Field Survey)

Above table shows the frequency of using UPI Apps throw payment in a Month by the respondents. It is clearly show that majority 36% of the respondents are 30-40 times using UPI Apps. They told that they are using UPI Apps as and when required. They also told that they are caring cash for purchasing the goods. But on the other hands, the students and business person are frequently using UPI Apps in the sample study area. Generally, some respondents are told that they are using UPI Apps while they are purchasing petrol and booking gas calendar.

**Table No.8 How much do you spend with this app in a month**

| Expencess       | Frequency | Percentage  |
|-----------------|-----------|-------------|
| 0-10000         | 9         | 26%         |
| 10000-20000     | 6         | 21%         |
| 20000-30000     | 4         | 11%         |
| More than 30000 | 15        | 42%         |
| <b>Total</b>    | <b>34</b> | <b>100%</b> |

(Source: Field Survey)

The above table are shown the money spends to the UPI throw in a months. Researcher

has observe that the maximum transactions and expenses are the UPI. It is 15 respondence are 42 % are use the 30000 and more than Payment are they are transfer money, payment for product shopping and other person transfers. Researcher has told that the easy and safe for the transaction and note care the money. Some respondents are told that they are using UPI Apps while they are purchasing petrol and booking gas cylinder.

**Table No.9 Are You Satisfied with UPI app security**

| Satisfaction | Frequency | Percentage  |
|--------------|-----------|-------------|
| Yes          | 32        | 95%         |
| No           | 2         | 5%          |
| <b>Total</b> | <b>34</b> | <b>100%</b> |

**(Source: Field Survey)**

Table No. 9 shows satisfaction towards UPI Apps security. Majority 32 (95%) of the respondents are satisfied for using UPI Apps and only 5 % of the respondents are not satisfied for using UPI Apps in the sample study area. It is clearly shown that digital technology and UPI Apps are very famous in the rural area. Researchers observed that some of the respondents are not satisfied for using UPI Apps in the sample study area. Researchers observed that there is a fear in mind for using UPI Apps in some respondents. So, they are not satisfied for using UPI Apps.

**Table No.10 Safety Precautions**

| Sources           | Frequency | Percentage  |
|-------------------|-----------|-------------|
| One time password | 32        | 95%         |
| Fingers           | 2         | 5%          |
| <b>Total</b>      | <b>34</b> | <b>100%</b> |

**(Source: Field Survey)**

Researchers observed that they are using UPI Apps for a digital payments platform should be simple, safe and efficient while carrying out payments. the researcher has a survey of the study 95 % respondence are the safety precaution use the apps lock for the password.

And 5 % respondence are told that the use of UPI are fingers digital payments.

**Table No.11 Purpose used the UPI App**

| Purpose      | Frequency | Percentage  |
|--------------|-----------|-------------|
| Personal     | 32        | 95%         |
| Business     | 2         | 5%          |
| <b>Total</b> | <b>34</b> | <b>100%</b> |

**(Source: Field Survey)**

Table No.11 shows the purposes of using UPI Apps by the respondents. Majority 32 (95%) of the respondents are using UPI Apps for personal. Personal use that is purchasing grocery items, hotel bills, mobile recharge, money transfer, to check the bank balance and for purchasing petrol. the respondents are using UPI Apps for other purposes. Mobile recharge of other person, It is clearly interpreted that majority of the respondents are using UPI Apps for mobile recharge.

**Table No.12 Do You Inform the other person**

| Information for others | Frequency | Percentage  |
|------------------------|-----------|-------------|
| Yes                    | 23        | 70%         |
| No                     | 11        | 30%         |
| <b>Total</b>           | <b>34</b> | <b>100%</b> |

**(Source: Field Survey)**

The respondents are told that they informs are recharging their mobile phones through their personal mobiles because they get various cash back offers and other offers also. Researchers observed that people are purchased grocery items frequently used. They also told that when they are not caring the cash and immediately purchasing the goods then and then only they are preferred the UPI Apps.

**Table No.13 Which factors impulse day our choice of UPI app**

| Factors              | Frequency | Percentage  |
|----------------------|-----------|-------------|
| Transaction Speed    | 21        | 63%         |
| Cash Back Offer      | 2         | 6%          |
| Security             | 9         | 26%         |
| Attractive interface | 2         | 5%          |
| Customers Support    | 0         | 0%          |
| <b>Total</b>         | <b>35</b> | <b>100%</b> |

**(Source: Field Survey)**

This table shows that the respondence are choice the UPI. The researcher are choice

to UPI. 63 % respondence told that the transaction immediately transfer. And 26 % are transaction are secure to the payment. Minimum 5% respondence are only use the UPI are attractive and other told that. UPI use the safe money and the not use the UPI are customers support.

**Table No.14 Period using the UPI Apps**

| Using the UPI Apps | Frequency | Percentage  |
|--------------------|-----------|-------------|
| 0-1 Years          | 5         | 15%         |
| 1-2 Years          | 8         | 22%         |
| 2-3 Years          | 7         | 21%         |
| More than 3        | 15        | 42%         |
| <b>Total</b>       | <b>35</b> | <b>100%</b> |

**(Source: Field Survey)**

Table No. 14 shows the how long the respondents are using UPI Apps in the sample study area. Majority 15 (42%) of the respondents are using UPI Apps More than 3 years. Then 22% of the respondents are using UPI Apps in one to two years. Only 15% of the respondents are using UPI Apps on minimum 1 years. It is clearly shown that the main reason of using UPI Apps is Corona Pandemic. After demonization period many of the people are using UPI Apps. 63 % respondence told that the transaction immediately transfer.

#### **RESULT:**

The study on awareness of using UPI apps and transactions UPI is a grand step towards making the cashless payments faster, smoother and easier. It is said that the launch of UPI will prove to be a milestone in the transformation of modern India. It is all set to become an efficient alternative to mobile wallets. The respondence are main purpose for use UPI in payment. Majority 15 (42%) of the respondents are using UPI Apps More than 3 years. the respondents are using UPI Apps for other purposes. Mobile recharge of other person, It is clearly interpreted that majority of the respondents are using UPI Apps for mobile recharge. significantly reducing reliance on cash and promoting a cashless economy. (NPCI), it has been incredibly well-liked among Indians. The total amount of UPI transactions in FY 2024 is ap-

proximately 172 billion transactions, representing a significant increase of around 46% compared to the previous year. Unified Payments Interfaced (UPI). More than the use of UPI Payments are use for the shopping and payment for the petrol, grocery bills etc. receipt and Payment are use this UPI, transaction and receipt source at the others person collect the rupees.

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## A New Era in Cyber Defense: AI and Machine Learning for Threat Detection

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### Abstract:

Digital technology's constant and quick development has had a profound effect on many industries, changing both personal and professional life. But the digital era has also brought up more intricate and dynamic cyber threats, which calls for a reconsideration of cyber security strategies. This study aims to evaluate the applicability and efficacy of artificial intelligence (AI) and machine learning (ML) in tackling both present and future cyber security issues.

**Keywords:** Machine Learning in Cyber security, Artificial Intelligence in Cyber security, Cyber Threat Detection, Predictive Analytics in Security.

### Introduction:

Artificial Intelligence (AI) in cyber security helps identify threats, respond to incidents, and automate security tasks by analysing large amounts of data in real-time. AI can quickly detect cyber threats like malware, ransomware, phishing, and unusual activities, much faster than traditional methods. Key benefits of AI in cyber security include automating threat intelligence, analysing behaviours, assessing risks, detecting intrusions, and actively hunting threats to reduce cyber risks. AI is widely used in firewalls, endpoint security, Security Information and Event Management (SIEM), Extended Detection and Response (XDR), and fraud detection systems to strengthen network security,

cloud security, and data protection.

Machine Learning (ML) is a type of Artificial Intelligence that allows systems to learn from data and make decisions without needing to be specifically programmed for each task. Instead of following fixed rules, ML systems learn from the data they receive, making them more efficient and less likely to make mistakes. This is very helpful in cyber security, where new and changing threats are hard to detect with traditional methods. ML improves security by analysing system logs, network activity, and user behaviour to spot unusual actions that might signal a security threat, like malware or unauthorized access.

### AI Works in Cyber security:

**Detection:** AI in cyber security learns patterns in data to recognize potential threats, just like how a dog can recognize the scent of family members. It spots unusual activities such as failed login attempts, unusual traffic patterns, or unauthorized file access. This allows AI to detect threats early before they escalate.

**Prediction:** Similar to a guard anticipating where burglars might strike next, AI predicts possible future cyber threats. By analysing historical data, AI can identify patterns or trends that suggest where and when a cyber attack might occur, giving security teams a heads-up to prepare or prevent it.

**Adaptation:** Just as a guard dog adapts to new methods burglars use, AI adapts to new and evolving cyber threats. It continuously learns from past incidents and adjusts its strategies to recognize new attack methods, improving its defines capabilities over time.

**Automation:** Think of a robotic security system that reacts automatically to a threat. AI can perform routine tasks, like blocking harmful IP addresses, isolating infected devices, or patching vulnerabilities without human intervention. This automation frees up security experts to focus on complex issues that require human insight.

**Response:** When your guard dog detects a

threat, it barks to alert you. Similarly, AI can trigger alerts in real-time, notifying security teams or even taking immediate action (e.g., isolating infected systems) to minimize the damage caused by an attack.

#### **Uses of AI in Cyber security:**

**Enhanced Threat Detection & Analysis:** AI algorithms have the ability to process data at a huge scale derived from many sources in real-time and flag out possible cyber threats by identifying patterns and irregularities. Algorithms in machine learning will be able to learn new data continuously to increase the detection exactitude and follow the dynamism of cyber threats progression. AI-enabled platforms for threat intelligence can be used to draw out different conclusions from different sources to ultimately give a broad and up to date risk picture.

**Automated Incident Response (AIR):** AI can streamline an initial response to the security issues with automating the incident triage and response, AI might increase the protection windows by allowing for faster detection and remediation of threats. With the machine learning, AI systems can take into account the parametricity and necessity of the alerts when they are working. This may relieve the employees from the burden of analyzing hundreds of alerts and by this will help them to target on the issues of greater involvement.

**Enhanced Security Risk Assessment:** AI technologies provide a way to make the system deep intelligence-based analysis of the whole IT structure, applications, and data. Then, information is provided about all potential security risks and vulnerabilities. Through the sophisticated analytics performed by machine learning algorithms, security managers can identify both the probability and the level of impact of the possible security cases. This will allow the companies to focus their mitigation efforts on the most critical incidents.

**User Behavior Analytics (UBA):** With AI algorithms, the behavior of the user can be analyzed

from the usage pattern, that can reveal any suspicious behavioral pattern other than the regular use, which may be an insider threat or an unauthorized access. Artificial intelligence algorithms can identify behavior peculiarities around lambda times, localities, and access manners across several dimensions. UBA services empower enterprises to uncover any anomaly about knowledge access by employees through auditing systems which in turn reduces the possibility of data breaches and insider risks. AI is increasingly being used to augment incident management processes

**Malware Detection and Prevention:** AI-powered malware scan systems can perform efficient pattern matching of a file such as its attributes and behaviors and hence can identify malware with accuracy. By observing and analyzing a range of malware samples, machine learning algorithms can form a pattern between previously unseen variants of malware and their characteristics and behaviors which they may have in common with known malware threats. AI-based programs of Watch Points may place different types of endpoints in quarantine or automatically remediate them when it sees that the devices are infected in order to block the spread of malware inside the network.

**Phishing and Email Scam Detection:** AI algorithms are able to analyze email contents, the sender's behavior, and other metadata that will enable them to successfully detect phishing and email scam attempts. The most up-to-date ML models can identify hidden signs like the fake sender, attachments or domain names stated in the e-mails that help classify a message as a phishing attack. AI-based Email security solutions have inbuilt blocking & quarantining advanced systems which eliminate the browsing of illegal phishing emails, so that the number of successful phishing attempts is drastically reduced.

**Vulnerability Management and Patch Prioritization:** AI helps to identify more likely

exploitation spot and the severity of the it on company's safety position. Algorithms of machine learning development can be used for analyzing historical data and the threat intelligence feeds to determine a set of the most critical vulnerabilities needing to be fixed immediately.

AI integrated vulnerability management and patching system can track and make patching process easier by 'AI-powered vulnerability management platforms can automate patch management critical application based on your priority schedule. This will reduce your exposure window for known vulnerabilities.

#### **Applications of Machine Learning in Cyber security:**

**Threat Detection and Prevention:** Machine Learning looks at lots of data to find patterns that might show something bad is happening, like a computer virus (malware), a phishing email trying to trick someone, or even an employee doing something they shouldn't. Machine learning learns from past attacks and can spot new threats as they come up, helping stop problems before they can cause harm.

**Behavioral Analysis:** Machine learning is really good at learning how people usually use their devices and networks. It looks at things like when users log in, what they do, and what files they access. If someone suddenly acts differently—like logging in at a strange time or trying to access files they never use—machine learning can flag it as suspicious. This helps security teams find out if someone is trying to break into the system or do something shady before it becomes a bigger problem.

**Vulnerability Management:** Every system has weaknesses, or "vulnerabilities," that hackers can try to exploit. Machine learning helps find these weak spots in the software or the network by analyzing code, system settings, and data about past attacks. By looking at the most dangerous vulnerabilities first, ML helps security teams focus on fixing the biggest issues first.

This way, companies can patch up their systems and protect themselves before attackers get a chance to cause harm.

**Threat Intelligence and Forecasting:** Machine learning isn't just about spotting problems that are happening now; it can also predict future attacks. By analyzing data from different sources, like hacker forums and security feeds, ML can spot new trends in cyber attacks. This helps companies prepare for what's coming next, allowing them to strengthen their defenses before the threats even happen. It's like having a crystal ball that helps companies see what types of attacks might happen in the future and get ready for them.

#### **Conclusion:**

AI is rapidly becoming an essential technology for boosting the effectiveness of IT security teams. The limitations of human scalability in adequately securing an enterprise-level attack surface are evident, and AI provides the crucial analysis and threat detection necessary for security professionals to mitigate breach risks and strengthen security measures. Machine learning is transforming how we protect our digital world from cyber threats. By analyzing data and recognizing patterns, it helps detect issues like viruses, hacking attempts, and unusual behavior more quickly and accurately. In this paper, I have discussed the basics of AI in cyber security and ML in cyber security, followed by a brief description of AI, its uses, and how it works. I also covered ML and some of its applications in cyber security.

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## CYBER SECURITY AND DIGITAL FRAUD

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### Abstract

Cybersecurity is crucial in safeguarding digital assets from evolving cyber threats and fraud. As online transactions and data exchanges increase, risks such as phishing, identity theft, and financial fraud pose significant challenges. This article examines key cybersecurity measures, emerging threats, and advanced fraud prevention technologies. It highlights the role of encryption, authentication mechanisms, and regulatory frameworks in mitigating risks and ensuring a secure digital landscape. Additionally, the study explores the integration of artificial intelligence, blockchain, and real-time monitoring to enhance security. By adopting robust cybersecurity strategies, organizations can effectively protect sensitive data and maintain trust in the digital ecosystem.

**Keywords:** Cybersecurity, Digital Fraud, Phishing, Identity Theft, Cyber Threats, Data Protection, Online Security

### I. INTRODUCTION

Cybersecurity is essential in today's digital age, in order to protect sensitive data and prevent digital fraud. With the rapid growth of online trading, businesses and individuals are increasingly at risk from cyber threats such as phishing, identity theft, malware attacks, and financial fraud. Cybercriminals use security gaps to steal personal and financial information, lead-

ing to economic losses and reputational damage. Cyberattacks not only affect sensitive data, they also weaken trust in digital systems. Because cyber threats arise, it is important to implement effective safety measures such as encryption, multifactor authentication, firewalls and continuous monitoring. Furthermore, businesses need to invest in training programs for their employees to recognize and mitigate cyber risk. Governments and organizations are working on stricter regulations and security frameworks to improve data protection. Estimating technologies such as artificial intelligence and blockchain also contributes to advanced threat detection and response. A combination of aggressive security strategies, technological advancements and sensitization programs can significantly reduce weaknesses.



**Figure No. 1 Identifying Cybersecurity and Digital Fraud Threats**

Cybersecurity and digital fraud are critical challenges in the modern digital landscape. The diagram highlights key risk factors, including phishing attacks, malware threats, identity theft, financial fraud, and data breaches. Understanding these threats helps organizations and individuals implement stronger security measures, ensuring safer digital transactions and protecting sensitive information.

### 1.1 Cyber Security

Cyber security refers to the practice of protecting computers, networks, and data from cyber threats, including hacking, malware, phishing, and ransomware. It involves using firewalls, encryption, antivirus software, and multi-factor authentication to safeguard sensitive information. Regular security updates and awareness training help prevent cyberattacks and ensure data protection.

### 1.2 Digital Fraud

Digital fraud involves deceptive practices using digital platforms to commit crimes like identity theft, phishing, online scams, and financial fraud. Cybercriminals manipulate vulnerabilities in websites, emails, and payment systems to steal money or personal information. Preventing digital fraud requires strong security measures, awareness, secure transactions, and authentication techniques.

### 1.3 Scope of the study

This study focuses on the importance of cybersecurity in protecting individuals and businesses against digital fraud. It can investigate frequent cyber threats such as phishing, identity theft, malware, and financial fraud, leading to data loss and financial damage. This study also considers security measures such as encryption, firewalls and multifactor authentication to prevent cyberattacks. Furthermore, government regulations and security address improved digital security. By understanding current challenges and new security technologies, this study aims to propose effective methods to reduce cyber threats and make online systems safer.

### 1.4 Objective of the study

- To understand different types of digital fraud and cyber threats.
- To explore the use of passwords, encryption, and security systems to protect data.

## II. LITERATURE REVIEW

**Salim Hasham et.al (2019)** This paper analyzes the increased risk of fraud and financial crime. This highlights automation vulnerabilities, increased trading volumes and cyber threats. It further highlights the need for developed regulations and a holistic, modernized strategy for efficient and effective management of fraud risks. **Anne Ajiri Alex-Omiobemi et.al (2024)**

This paper examines e-channel fraud, its evolving forms, and cybersecurity strategies for financial institutions. It highlights advanced technologies, behavioral analytics, real-time monitoring, and organizational best practices to enhance fraud detection, strengthen security, and maintain customer trust. **Olena Dobrovolska et.al (2024)** This article examines the impact of digital transformation on anti-corruption and circular fraud systems by analyzing the Corruption Perception Index, the National Cybersecurity Index, and the ICT Development Index from 138 countries. It finds positive correlations, shows the role of digital technologies in reducing corruption and improving cybersecurity. **Karthik Meduri et.al (2024)** This article explores the use of unsupervised learning for fraud detection in banking, addressing the limitations of traditional methods and providing a framework for implementation. It highlights the role of advanced machine learning in enhancing cyber security and securing digital transactions.

**Rosita Eberechukwu Daraojimba et.al (2023)**

This study checks the development of forensic accounting in the fight against digital financial fraud, the emphasis on advanced technology, ambitious fraud types, and the role of AI. We discuss the tasks, recommend continuous learning, and propose future research on regulatory and technical effectiveness. **Natile Nonhlanhla Cele et.al (2024)** The study identifies key cybersecurity threats hindering digital banking adoption and proposes sustainable strategies to mitigate risks. A systematic review of 58 studies highlights identity theft, malware, phishing, and vishing as major concerns in the banking sector. **Michaela Karin Trierweiler et.al (2023)** A fraud management framework was developed using the Design Science Research Approach of Design Science to minimize fraud in the digital and sociotechnical environments associated with small business. This modular frame helps SMEs identify risks of fraud and implement TaylorMade fraud management programs. It deals with both experts and cyber scams.

**Krishan Tuli et.al (2023)** The rapid growth of online and mobile channels has created new

possibilities, but the risk of electronic crime and digital fraud also increases. Cybercriminals use weaknesses in individuals, processes and technology, leading to global initiatives involving India's specialized cyber cells to combat these threats. **Prof. Ms. Tejaswini Untawale (2021)** Cybersecurity plays a key role in information technology and is based on the growing threats caused by digital crime. Due to the daily escalating cyber threats, this paper focuses on network protection, cybersecurity and cyberterrorism, which can cause significant economic losses for businesses. **Khushwant Singh et.al (2023)** This study focuses on customer awareness, cybersecurity, and ways to prevent electronic fraud in e banking. It demonstrates hacking, phishing risks, and the need for stronger security measures for nationalized banks to protect customer information.

**Table 1: Summary of Studies on Fraud Detection and Cybersecurity Methods**

| Author & Year                         | Factors/Variables                                  | Method                                            | Conclusion                                                                                  |
|---------------------------------------|----------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------------------------------|
| Victor Chang et.al (2022)             | Digital payment fraud, ML models                   | Comparative analysis of ML models                 | Random forest & logistic regression best for fraud detection in Industry 4.0                |
| Efijemue Oghenekome Paul et.al (2024) | Cybersecurity, fraud detection, financial security | Review and analysis of security strategies        | AI, ML, encryption, and collaboration improve financial security against fraud              |
| George Loukas et.al (2022)            | Phishing, misinformation, digital deception        | Case studies on cyber fraud tactics               | Human deception plays a key role in cyber fraud and misinformation                          |
| Muath Asmar et.al (2024)              | ML in digital banking security                     | Review of ML algorithms & SWOT analysis           | ML enhances cybersecurity but presents challenges like ethical concerns and insider threats |
| Massimiliano Aschi et.al (2022)       | Fraud in financial transactions                    | Fraud detection methods, cybersecurity frameworks | Fraud evolves continuously, requiring adaptive detection methods in financial cybersecurity |
| Agbaje et.al (2015)                   | Digital watermarking, cyber security               | Literature review & case study                    | Digital watermarking strengthens cybersecurity against data theft and identity fraud        |

## 2.1 Research Gap

Despite extensive research into cybersecurity, fraud detection and digital banking transactions safety, there are key gaps. Most

research focuses on machine learning fraud detection (Victor Chang et.al, 2022; Muath Asmar et.al, 2024) and general cybersecurity strategies (Efijemue Oghenekome Paul et.al, 2024). However, the framework conditions for AI controls for fraud prevention tailored to new financial threats in developing countries are losing. Although the research highlights phishing, malware, and identity theft (Khushwant Singh et.al, 2023), there is no empirical study on real-time threatening surveillance and adaptive security frameworks. The role of blockchain in fraud detection remains limited (Anne Ajiri Alex-Omiogbemi et.al, 2024). Furthermore, existing framework conditions focus primarily on the gaps between developed countries and gaps in the contextualization of fraud detection in regions such as India (Krishan Tuli et.al 2023). Customer awareness and human factors in preventing fraud also require limited attention. Future research should consider adaptive AI security models, blockchain integration, and regional-specific strategies to reduce fraud reduction.

## III. RESEARCH METHODOLOGY

This study follows a systematic approach to analyzing cybersecurity threats and digital fraud, and focuses on precautions and technological advances. This study is based on qualitative and quantitative research methodologies that include data from secondary sources such as academic journals, government reports, industrial papers, and cybersecurity case studies. A literature search is performed to understand the effectiveness of various cyber threats, their effectiveness, and security measures such as encryption, firewalls, and multifactor authentication. Additionally, we examine actual cyberattack cases to assess weaknesses and security gaps. Regulatory frameworks and cybersecurity guidelines are checked to assess their role in reducing cyber risk. The opinions of cybersecurity experts and industry report experts are considered as an ambitious understanding

of security technologies and best practices. A comparative analysis of various security strategies is conducted to determine the most effective approach to protecting your digital assets. By combining theoretical knowledge with real data, this study aims to convey a comprehensive understanding of cybersecurity issues and to recommend proactive strategies to reduce the risk of digital fraud in the developing technological landscape.

### 3.1 Limitations

Despite advances in cybersecurity and fraud detection, there are some limitations. The main challenge is the development of cyber threats, as hackers continue to develop sophisticated technologies such as AI controlled attacks, phishing, and ransomware, making traditional security measures inadequate. Furthermore, many cybersecurity frameworks rely on machine learning models that require extensive data training, and may require real-time fighting to detect threats. Another limitation is the lack of global standardization in cybersecurity guidelines, leading to inconsistencies in fraud prevention strategies in financial institutional fraud complaints. Cybersecurity measures often focus on technical solutions and overlook human factors such as customer perception and employee negligence that remains substantial. High implementation costs and resource limitations also limit the adoption of advanced cybersecurity technologies, particularly in small financial institutions and developing countries. Blockchain and encryption improve security, but they are not innocent and can still be used. This underscores the need for continuous innovation in fraud prevention.

## IV. CASE STUDY

### Case Study 1: The Yahoo Data Breach (2013-2014)

One of the largest data breaches in history, the Yahoo cyberattack exposed the personal information of over 3 billion user accounts. The attack was carried out by cybercriminals

who exploited weak security measures and inadequate encryption techniques. Hackers gained access to usernames, email addresses, phone numbers, and hashed passwords, demonstrating the importance of strong authentication mechanisms and robust encryption. This case emphasizes the need for financial institutions and businesses to implement multi-factor authentication (MFA) and advanced encryption protocols to protect user data from unauthorized access.

### Case Study 2: The Equifax Data Breach (2017)

Equifax, a major credit reporting agency, suffered a cyberattack that compromised the sensitive financial and personal information of 147 million customers. The breach occurred due to an unpatched vulnerability in the Apache Struts web application framework. Attackers exploited this weakness to steal social security numbers, birth dates, and financial records. The case highlights the importance of regular security updates, strong password policies, and advanced security systems, including AI-driven threat detection. It also underscores the necessity of real-time monitoring to detect anomalies in network traffic and prevent unauthorized data access.

### 4.1 Findings:

- **Weak Security Measures Increase Risks:** Both the Yahoo and Equifax breaches were caused by weak security protocols, such as inadequate encryption and failure to update software vulnerabilities, making sensitive data vulnerable to cybercriminals.
- **Lack of Multi-Factor Authentication (MFA):** Yahoo's breach highlighted the dangers of relying solely on passwords for authentication, as hashed passwords were compromised.
- **Failure to Patch Known Vulnerabilities:** The Equifax breach occurred due to an unpatched Apache Struts vulnerability, showing the critical need for timely software updates.
- **Significant Financial and Reputational Damage:** Both cases resulted in financial losses,

regulatory penalties, and reputational damage, emphasizing the long-term impact of security breaches.

#### 4.2 Suggestions:

- Implement Multi-Factor Authentication (MFA): Organizations should enforce MFA to add an extra layer of security beyond traditional passwords.
- Strengthen Encryption Techniques: Companies must use strong encryption algorithms to protect sensitive user data from unauthorized access.
- Regular Software Updates and Patching: Businesses should establish a strict patch management system to fix security vulnerabilities promptly.
- Adopt AI and Machine Learning-Based Security: AI-driven threat detection can help monitor network traffic in real-time and identify suspicious activities.
- Enhance Employee Awareness and Training: Organizations should conduct cybersecurity training programs to prevent phishing attacks and insider threats.
- Improve Real-Time Monitoring and Incident Response: Financial institutions should deploy Security Information and Event Management (SIEM) systems to detect and mitigate threats in real-time.

#### V. CONCLUSION

Cybersecurity plays a key role in protecting individuals and organizations from digital fraud. This continues to develop with advances in technological advances. The study highlights the growing threats from cyber fraud, including phishing, identity theft, and malware attacks, and highlights the need for advanced security measures. Effective strategies such as encryption, multifactor authentication, and real-time threat monitoring significantly reduce security risks. Additionally, strict regulatory frameworks and cybersecurity guidelines can help reduce cyber threats by implementing compliance and best practices. Companies need to continuously

update their security protocols and invest in ambitious technologies such as artificial intelligence to improve fraud awareness. By implementing proactive security measures and promoting awareness of cybersecurity, individuals and businesses can minimize economic losses and reputational damage. Enhanced cybersecurity frames are essential to ensuring a safer digital environment in the rapidly evolving digital world.

#### 5.1 Future Scope

The future of cybersecurity and digital fraud prevention lies in the integration of advanced technologies and proactive strategies to counter evolving threats. Artificial Intelligence (AI) and Machine Learning (ML) will play a crucial role in predictive fraud detection, enabling financial institutions to identify and prevent cyber threats in real-time. Blockchain technology is expected to enhance security by providing transparent, tamper-proof transactions, reducing risks associated with identity theft and fraudulent activities. cybersecurity frameworks will focus more on behavioural biometrics, multi-factor authentication (MFA), and zero-trust architectures to strengthen security measures. The adoption of quantum cryptography will also revolutionize data protection, making encryption nearly unbreakable. international collaboration among financial institutions, regulatory bodies, and cybersecurity experts will be essential to develop standardized security policies. Continuous research and awareness programs will be vital to educate individuals and organizations about cyber risks, ensuring a safer digital financial ecosystem in the future.

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## Digital Financial Literacy and IT

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### Abstract:

This research paper provides is to study the impact of digital financial literacy and IT. This paper explores the intersection of digital financial literacy and information technology, emphasizing how IT tools, such as online banking, digital wallets, mobile payment systems, and investment platforms, empower individuals to manage their finances more efficiently. This paper underscores the need for digital financial literacy programs that equip individuals with the knowledge and skills to navigate the digital financial landscape safely and successfully. Ultimately, the research emphasizes that combining financial knowledge with digital skills will enable individuals to make informed, secure, and effective financial decisions in a digital economy.

**Keywords:** Digital Financial Tools, Financial Data Security, Financial literacy

### Introduction:

Digital financial literacy and Information Technology (IT) has reshaped how individuals and businesses manage finances. Digital financial literacy involves the understanding and application of digital tools and platforms to make informed financial decisions, whereas IT refers to the use of technology and systems that facilitate the creation, management, and exchange of financial information. Together, they form a symbiotic relationship that enables users to navigate the complexities of digital finance securely and effectively. Digital financial

literacy is all about the combination of Fintech and financial literacy. Digital Financial Literacy combines objective financial knowledge with four dimensions of digital literacy including digital knowledge, awareness of digital financial services, tacit knowledge of using digital financial services, and the ability to avoid digital fraud. Digital Financial Literacy is the ability of individuals to use digital devices to make financial decisions. There is a need for digital financial literacy across all consumers because of increasing fraud victimization due to digitalization, which prone individuals to misinformed financial decisions

Ten years ago, withdrawing money required a visit to the bank and filling out a form. Today, with just one click, you can access money anywhere in the world. This transformation, driven by digitalization, has revolutionized our economy by converting information into digital form, simplifying many processes. Digitalization is propelling the world to new heights, and India is not lagging behind. From withdrawing money to loan payments, almost everything in India is now digitalized.

### What is Digital Financial Literacy?

Digital Financial Literacy to understand and use digital tools, technologies, and platforms to manage financial activities effectively. It combines knowledge of financial concepts (such as budgeting, saving, investing, and managing debt) with the skills needed to navigate digital financial services, such as online banking, mobile payments, and investment platforms, while ensuring the security of personal financial information in a digital environment.

### Objectives

- Educate individuals on how to use digital banking services (online banking, mobile payments, digital wallets, etc.).
- Teach how to securely use financial apps and services, such as budgeting tools, investment platforms, and loan management apps.
- Promote the use of digital tools to track

spending and save money, including understanding mobile wallets, expense trackers, and budgeting apps.

- Enable individuals to use digital payment methods efficiently.
- Educate individuals on how to manage taxes digitally, including filing and understanding tax laws.
- Learn how to use online tax filing services like TurboTax or H&R Block.
- Understand the role of digital receipts, expense tracking, and tax deductions for freelancers or small businesses.
- Understand how digital income tracking and reporting can simplify tax filing, including understanding virtual income like cryptocurrency or online sales.

### Importance of Digital Financial Literacy and IT

Digital Financial Literacy and Information Technology (IT) are essential for individuals and businesses in the modern world. The adoption of digital financial services such as mobile banking, digital wallets, and online payment platforms has surged. This shift necessitates that individuals possess the requisite knowledge and skills to use these services effectively, securely, and efficiently.

#### 1. Enhancing Financial Inclusion:

Digital literacy and financial literacy can bridge the gap for individuals who may have limited access to traditional banking services. Many digital financial platforms allow users to make payments, transfer money, and save or invest with ease, helping those in underbanked or unbanked regions access essential financial tools.

#### 2. Security and Fraud Prevention:

IT knowledge is crucial in understanding cybersecurity risks and how to protect sensitive financial data. The more digitally literate someone is, the better they can safeguard themselves against online scams, phishing, and fraud, which are increasingly common in the

digital age.

### 3. Online Safety

People or groups with malicious intent continuously discover and develop new ways to exploit others; therefore, the risks associated with the internet world are constantly evolving. Although digital literacy skills may not wholly shield students from online safety challenges, they can help equip them with crucial knowledge, awareness, tools, processes, and resources to safeguard their privacy and safety while being online.

### 4. Lifelong Skills

Digital literacy can support the development of strong life skills in several ways. It can enhance communication skills by providing individuals with the ability to express themselves effectively online and teach them about collaboration with others using digital tools. Digital literacy can also improve critical thinking skills by enabling individuals to evaluate the credibility and reliability of online information. It can support the development of problem-solving skills and creativity by providing individuals with the ability to navigate digital technology tools, troubleshoot technical issues and use digital tools to create and share multimedia content.

### 5. Workforce Development:

The job market increasingly demands employees who are digitally literate and financially savvy. These skills can enhance employability and career growth, particularly in industries that rely on technology for financial transactions and data analysis.

### Increasing recognition of importance of digital financial literacy in IT

Financial technology (fintech), i.e., using software, applications and digital platforms to deliver financial services to consumers and businesses through digital devices such as smart phones, has become recognized as a promising tool to promote financial inclusion, i.e., access of excluded households and small firms to financial products and services. In 2010, the G20

endorsed the Financial Inclusion Action Plan (FIAP) and established the Global Partnership for Financial Inclusion (GPFI) to coordinate and implement it. The FIAP was updated at the 2014 G20 Leaders Summit in Brisbane and, acknowledging the importance of fintech, includes a commitment to implement the G20 Principles for Innovative Financial Inclusion under a shared vision of universal access (BIS and WB 2016). However, improved access to financial services via fintech requires higher levels of digital financial literacy to make effective use of them and to avoid miss-selling, frauds such as phishing, hacking attacks, unauthorized use of data, discriminatory treatment and behavioral issues such as excessive borrowing. Digital financial literacy is likely to become an increasingly important aspect of education for the Digital Age.

### Research Methodology:

#### Research Design

The research will describe the current state of digital financial literacy and explore how IT impacts financial behavior. To explore the relationship between digital financial literacy levels and the use of IT tools in personal finance management.

#### Data Collection Methods

- **Surveys/Questionnaires:** Distributed to individuals to assess their level of digital financial literacy, familiarity with IT financial tools, and attitudes toward cybersecurity. This can include questions about their usage of mobile banking, financial apps, investment platforms, etc.
- **Interviews:** In-depth interviews with financial experts, IT professionals, and end-users to gain insights into the challenges and opportunities related to integrating IT with financial literacy.
- **Focus Groups:** Group discussions involving participants from diverse demographic backgrounds to explore their experiences, attitudes, and barriers in using digital financial tools.
- **Literature Review:** Existing academic and industry studies on digital financial literacy, IT in personal finance, and cybersecurity practices.

· **Reports and Surveys:** Data from reputable sources (such as government reports, industry surveys, and financial literacy organizations) that provide context on trends in digital financial literacy and technology adoption.

#### Research Instruments

· **Survey/Questionnaire:** A structured tool to collect data on digital financial literacy, usage of IT tools (e.g., mobile banking, budgeting apps), and knowledge of cybersecurity practices. The survey would include both multiple-choice and open-ended questions to capture both quantitative and qualitative data.

#### Finding and Suggestions:

##### Findings:

· **Low Awareness of Digital Financial Tools:** Many individuals lack awareness of the range of digital financial tools available, such as budgeting apps, mobile payment systems, investment platforms, and digital wallets. This limits their ability to manage finances effectively in a digital-first world.

· **Financial Inclusion Challenges:** Digital financial literacy initiatives are often inaccessible to underserved populations, including individuals in developing countries, lower-income communities, and people with disabilities. This exclusion perpetuates economic disparities, preventing equitable access to digital financial tools.

· **Cybersecurity Concerns:** Despite the availability of secure digital financial tools, many users are still not fully aware of the risks associated with online banking, digital transactions, and mobile payments. This lack of cybersecurity awareness exposes users to identity theft, online fraud, and scams.

· **Limited Understanding of Digital Investments:** While there is an increasing interest in digital investments (cryptocurrency, robo-advisors, online stock trading), many individuals still do not fully understand the mechanisms or risks of these technologies. This lack of knowledge may lead to poor financial decisions.

##### Suggestions:

· **Offer Free Online Resources:** Develop and promote free, accessible online courses, webinars, and tutorials on digital finance tools, cybersecurity, and financial decision-making. Platforms like government sites could offer these

courses for free or at a low cost.

· **Collaboration with Financial Institutions:** Banks and financial platforms should partner with cybersecurity experts to provide training for customers on securing their financial data and recognizing fraudulent activities.

· **Digital Tools for Long-Term Planning:** Encourage the development of tools that help individuals make long-term financial decisions, such as retirement savings, investment portfolios, and estate planning, through secure and accessible digital platforms.

· **Financial Health Tracking:** Provide tools that not only help users manage day-to-day finances but also track their financial health over time. These tools can provide insights into spending, saving, and investing behaviours and guide users toward healthier financial practices.

#### Conclusion

Digital financial literacy and information technology (IT) have become essential components of modern society. The growing integration of digital tools and platforms in financial services means that individuals need to develop both digital skills and financial literacy to navigate the evolving landscape. Here's a conclusion based on this:

In conclusion, digital financial literacy and IT are intertwined and crucial for empowering individuals in today's digital economy. As financial services continue to transition to digital platforms, understanding how to use these tools securely and effectively is key to managing personal finances, investing wisely, and avoiding financial risks. The increasing use of mobile apps, online banking, cryptocurrencies, and fintech innovations underscores the importance of both technical proficiency and financial knowledge.

Promoting digital financial literacy can help individuals make informed decisions, improve financial well-being, and bridge the digital divide. Governments, educational institutions, and the private sector must collaborate to offer accessible and comprehensive training that empowers people with the skills they need to thrive in a digital-first financial world. Ultimately, as digital literacy and financial knowl-

edge grow, individuals are better equipped to take control of their financial futures, drive economic growth, and contribute to a more inclusive global financial system.

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## Computational Modeling for Predicting Digital Financial Awareness Propagation in Rural India: Analyzing the Role of Education, Infrastructure, and Technology Access

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#### Abstract:

Digital financial awareness is essential for financial inclusion, particularly in rural India, where challenges such as limited education, inadequate infrastructure, and restricted access to technology persist. This study employs computational modelling to predict how digital financial literacy propagates among rural populations. Using agent-based models, diffusion theories, and computational fluid dynamics (CFD) principles, the research identifies key demographic and infrastructural determinants that influence adoption. The findings offer insights into policy interventions to accelerate digital financial inclusion. The study also explores the role of government initiatives and socio-economic influences in shaping financial literacy trends across diverse rural settings. Furthermore, it discusses the impact of behavioural economics in influencing adoption patterns and how digital financial awareness programs can be optimized based on predictive simulations.

**Keywords:** Digital Financial Awareness, Computational Modelling, Rural India, Financial Inclusion, Diffusion Models, Agent-Based Modelling, Computational Fluid Dynamics, Digital Payments, Behavioural Economics.

## 1. Introduction

The rapid digitalization of financial services has the potential to transform rural economies by enabling seamless transactions, enhancing savings, and reducing dependency on cash. However, digital financial literacy remains low in rural India due to socio-economic and infrastructural barriers such as low internet penetration, limited access to formal banking, and lack of awareness. Computational models can help predict how digital financial awareness spreads within rural communities, enabling policymakers to design targeted interventions. The study emphasizes the need for a multi-faceted approach that integrates technology, policy, and education to enhance digital financial literacy. Additionally, the study considers psychological and social resistance to digital finance, which can influence the speed and effectiveness of adoption.

## 2. What is Computational Modeling for Predicting Digital Financial Awareness Propagation in Rural India?

Computational modeling refers to the use of mathematical, statistical, and simulation-based techniques to analyze and predict complex real-world phenomena. In the context of digital financial awareness propagation, computational models help simulate how knowledge of digital finance spreads within rural communities. These models take into account key influencing factors such as education levels, infrastructure availability, internet penetration, social influence, and behavioral economic variables.

By applying **diffusion models**, **agent-based simulations**, and **computational fluid dynamics (CFD) principles**, we can understand how digital financial knowledge moves through a population, identifying bottlenecks and accelerators in adoption. The integration of computational modeling with financial literacy research allows policymakers to optimize awareness campaigns, tailor interventions for specific

demographic groups, and enhance the overall adoption of digital financial services in rural India.

## 3. Objectives of the Study

- To apply computational fluid dynamics (CFD) concepts to simulate financial knowledge diffusion and its adoption patterns.
- To assess the role of demographic variables such as education, infrastructure, and technology access in financial awareness propagation.
- To identify optimal policy interventions to enhance digital financial awareness and promote digital financial inclusion.
- To integrate behavioral economic principles to analyze how trust, perceived risk, and incentives affect digital financial adoption.

## 4. Research Methodology

• **Computational Approach:** The study employs agent-based modeling (ABM), diffusion models, and CFD principles to simulate the spread of digital financial literacy.

• **Data Collection:** Secondary data from government reports, surveys, financial inclusion indices, case studies from rural communities, and behavioral economic research on financial decision-making.

• **Simulation Parameters:**

Education levels (illiterate, primary, secondary, higher education)

Technology access (smartphone penetration, internet connectivity)

Social influence (peer adoption, government campaigns, local community initiatives)

Economic factors (income level, occupation type, financial stability)

Psychological variables (trust in digital payments, perceived risk, incentives, resistance to change)

• **Analysis:** Monte Carlo simulations, network analysis, differential equation-based modeling, and behavioral economic modeling to identify key influencers, adoption bottlenecks, and policy impact zones.

## 5. Extra Information Regarding the Title

The study integrates **computational fluid dynamics (CFD) principles** to analyze financial literacy as a **diffusion and flow phenomenon**. Just as fluids move through different resistance levels, **digital financial awareness spreads through social and economic barriers**. CFD modeling helps in understanding how financial knowledge moves through different layers of a community, encountering resistances such as lack of infrastructure or socio-cultural hesitations. By using CFD models, policymakers can identify adoption bottlenecks and optimize awareness campaigns by targeting specific barriers. Furthermore, diffusion-based models help in predicting the speed and pattern of adoption, enabling better resource allocation for digital finance initiatives. The study also extends the diffusion model to analyze network effects, peer-to-peer influence, and the role of social media in accelerating digital financial literacy among rural users.

## 6. Conclusion

Computational modeling provides a powerful tool to predict and enhance digital financial awareness in rural India. The study suggests that a combination of education initiatives, improved digital infrastructure, and targeted policy interventions can significantly improve adoption rates. Applying CFD principles allows for better visualization and analysis of financial literacy diffusion, ultimately aiding policymakers in designing effective strategies. The integration of social influence, economic factors, and infrastructure variables into computational models helps in understanding the barriers and accelerators of financial awareness adoption. Furthermore, the study highlights the importance of behavioral economics in shaping financial decision-making, emphasizing the need for trust-building measures, incentives, and culturally relevant financial education. Future research can incorporate real-time data, machine learning models, and longitudinal studies to refine

predictions, assess government interventions, and design adaptive policies for sustainable digital financial inclusion.

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## Geographical Barriers to Digital Payment System Adoption in Rural Maharashtra

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### Abstract:

India is rapidly advancing towards a cashless economy, with the government promoting digital payment systems under initiatives like Digital India. However, the adoption of digital payment systems in rural India, especially in states like Maharashtra, remains limited due to a variety of geographical barriers. These geographical barriers, such as poor connectivity, infrastructure issues, difficult terrain, and distance from urban centers, significantly affect the usage of digital payment platforms in the rural regions. Maharashtra, despite being one of India's most economically developed states, has a significant rural population spread across varied geographical landscapes, including coastal areas, plateaus, hills, and tribal regions. The state's rural areas often face challenges such as limited mobile network coverage, inadequate infrastructure, poor road access, and lack of digital literacy, which hinder the widespread adoption of digital payments. In this context, Geographic Information Systems (GIS) can be a powerful tool for analyzing the spatial and geographical barriers that hinder the widespread adoption of digital payments. GIS provides a spatial framework for mapping and analyzing key variables such as network coverage, mobile tower density, road infrastructure, and geographic isolation. This section will focus on the

role of GIS analysis in identifying and addressing geographical barriers to the adoption of digital payment systems in rural Maharashtra

**KeyWords:** Geographical barriers, Maharashtra, Digital Payment

### 1. Introduction:

India has made remarkable strides in the adoption of digital payment systems in recent years, driven by the government's push for a Digital India and financial inclusion initiatives. While digital payment systems have gained momentum in urban areas, their penetration in rural Maharashtra has been slow due to various challenges. One of the most significant obstacles to the widespread adoption of digital payments in rural regions is geographical barriers. Factors such as poor connectivity, inadequate infrastructure, difficult terrain, and remote locations create substantial hurdles for the effective implementation of digital payment systems in rural areas. This report delves into the geographical barriers that hinder the adoption of digital payment systems in rural India. It assesses how geographic features influence the access, usage, and sustainability of digital payment systems and provides actionable recommendations to overcome these barriers.

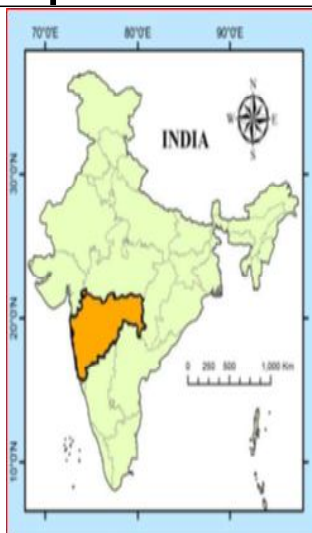
### 2. Research Objectives:

The primary objectives of this report are:

1. To identify and examine the geographical barriers hindering the adoption of digital payment systems in rural Maharashtra.
2. To explore how geographic challenges interact with socio-economic factors in limiting digital payment adoption.
3. To explore the socio-economic impacts of geographical barriers on the adoption of digital payment systems.

**3. Study Area:** Maharashtra state in the western peninsular region of India occupying a substantial portion of the Deccan Plateau. It is bordered by the Arabian Sea to the west, the Indian states of Karnataka and Goa to the south, Telangana to the southeast and also the

Chhattisgarh state to the east, Gujarat and Madhya Pradesh to the north, and the Indian union territory of Dadra and Nagar Haveli and Daman and Diu to the north-west. [18] Maharashtra is the third-most populous state in India and the fourth-most populous country subdivision in the world.



#### 4. Geographical barriers:

The adoption of digital payment systems in rural Maharashtra faces several geographical barriers that impact accessibility, infrastructure, and user behavior. Below are the key geographical challenges hindering the widespread adoption of digital payments in these areas:

##### 4.1. Connectivity Issues:

Mobile network coverage and internet connectivity are two of the most critical barriers to the adoption of digital payments in rural Maharashtra. Areas with low network signals or slow internet speeds cannot effectively use mobile wallets, banking apps, or online payment platforms.

**Limited Internet Access:** Many rural areas of Maharashtra still face poor or no internet connectivity, particularly in remote villages. Without stable internet access, users cannot reliably make online payments or use mobile payment systems.

**Weak Network Infrastructure:** Rural regions often experience weak mobile networks, especially in the hinterlands. This hampers the ability of residents to use digital wallets, banking apps, and other online payment methods that rely on stable mobile data.

**Konkan Region:** Coastal areas have relatively better connectivity but still face occasional net-

work congestion during peak hours or during monsoon seasons when infrastructure can be disrupted by heavy rainfall and flooding.

**Vidarbha and Marathwada Regions:** Both regions face significant challenges with poor internet speeds and limited mobile network coverage, especially in remote villages. Even though 4G network services have been rolled out in some areas, their reliability remains inconsistent.

**Key Observations:** Weak mobile signals and limited internet access in many rural areas of Maharashtra hinder the seamless use of mobile-based payment systems. In Vidarbha, which has a more arid landscape and dispersed population, network coverage is sparse, limiting access to financial apps and services.

##### 4.2. Geographical Remoteness:

Many rural areas in Maharashtra are geographically isolated, located in hilly terrains, tribal areas, and remote villages, where infrastructure development is limited, and access to financial services is often difficult. These areas often lack the basic banking infrastructure necessary to support digital payments.

**Distance from Urban Centers:** Rural Maharashtra is often far from urban centers where infrastructure and digital services are more advanced. Villages that are isolated or located in hilly or forested areas struggle with access to the necessary technological infrastructure.

**Limited Access to Service Points:** Many rural areas lack physical infrastructure such as retail shops or banking kiosks that can offer digital payment services. This limitation increases the dependence on physical cash transactions.

**Marathwada and Vidarbha Regions:** Both regions are known for their rugged terrain and distant villages that are hard to reach. Many people in these areas do not have access to bank branches or ATMs, making digital payments a challenge.

**Konkan Region:** While some coastal villages

are relatively well-connected, hilly areas in Konkan face terrain-related barriers to mobile network installation.

**Key Observations:** Geographical isolation in hilly and tribal areas makes it difficult for people to access financial services and digital payment tools. Poor road networks and difficult terrain affect the delivery of digital services and limit the reach of banking infrastructure.

#### 4.3. Inadequate Infrastructure:

Lack of proper infrastructure, such as electricity, charging stations, and digital service centers, is another significant geographical barrier. Rural areas with unreliable power supply find it difficult to maintain electronic devices necessary for digital payments, such as smartphones or computers.

**Electricity Shortages:** Many rural parts of Maharashtra experience frequent power outages, which disrupt the ability to charge devices, run POS (Point of Sale) terminals, or maintain the infrastructure required for digital payment systems.

**Lack of Access to Smartphones:** Although smartphone penetration has increased, many rural residents still lack smartphones or have access to low-end phones that are incompatible with digital payment apps. This limits the reach of mobile payment systems.

**Absence of Physical Bank Branches:** Rural areas often have limited or no access to nearby banks, making it difficult for people to use traditional banking or digital banking services.

**Vidarbha Region:** Many villages in this region face frequent power cuts, which makes it difficult to charge smartphones and use digital payment systems.

**Marathwada Region:** The lack of mobile recharge stations or internet cafes in remote areas exacerbates the problem of charging phones or accessing the internet.

**Key Observations:** Power outages and lack of access to reliable electricity in rural areas affect the consistent use of smartphones and

mobile payment platforms. There is a need for more charging stations and solar-powered solutions in areas with limited power infrastructure.

#### 4.4. Low Literacy Rates and Digital Literacy:

**Limited Digital Literacy:** Many rural residents, especially the elderly or those with lower educational backgrounds, are not familiar with using smartphones or digital payment systems. Without adequate training or awareness programs, even basic tasks like setting up a mobile wallet or making online transactions become daunting.

**Language Barriers:** Many digital payment systems are available in English or regional languages that are not commonly spoken in rural Maharashtra, making it difficult for locals to understand or use these systems.

#### 4.5. Cultural and Behavioral Factors:

**Preference for Cash Transactions:** Rural Maharashtra has a deep-rooted culture of cash-based transactions. People are often more comfortable dealing with cash as it is perceived as a tangible and immediate form of payment, leading to reluctance to adopt digital alternatives.

**Trust Issues:** People in rural Maharashtra may be suspicious of digital payments, fearing fraud or loss of money. They may also distrust technology due to a lack of awareness or understanding of its security features.

#### 4.6. Lack of Local Merchant Adoption:

**Limited Merchant Infrastructure:** In many rural areas, local shopkeepers and businesses are not equipped with the technology or tools to accept digital payments. This is often due to a lack of knowledge, insufficient internet access, or high transaction costs associated with setting up digital payment systems.

**Preference for Cash on Delivery (COD):** In rural markets, cash on delivery is often the preferred method of payment, especially for products bought online or from local markets. The reluctance of merchants to adopt digital pay-

ment systems further discourages their use.

#### 4.7. Financial Inclusion Barriers:

**Limited Access to Financial Services:** Many rural households in Maharashtra are excluded from the formal financial system, lacking access to bank accounts, credit, or debit cards. Without access to banking services, using digital payment platforms becomes impractical.

**Underdeveloped Payment Networks:** Digital payment platforms often require integration with formal financial systems such as banks or credit card networks. Rural areas may have limited access to these services, preventing the seamless flow of digital payments.

#### 4.8. Security Concerns:

**Fear of Cyber security Risks:** The lack of understanding of digital security protocols, such as encryption or secure payment gateways, raises concerns about digital payment security in rural Maharashtra. Many people fear that their data might be stolen or that they could become victims of online fraud.

**Absence of Support Mechanisms:** In case of issues with digital transactions, there is often no immediate customer service or support available in rural areas to help resolve problems.

#### Conclusion:

Geographical barriers, including poor connectivity, limited infrastructure, difficult terrain, and socio-economic factors, present significant challenges to the adoption of digital payment systems in rural Maharashtra. However, addressing these barriers through improved connectivity, infrastructure development, power supply solutions, and digital literacy programs will help pave the way for greater financial inclusion. Addressing these geographical barriers requires a multi-pronged approach that includes improving infrastructure, offering digital literacy programs, expanding mobile network coverage, and increasing trust through awareness campaigns. By overcoming these challenges, Maharashtra can ensure that its rural population benefits from the convenience and

accessibility of digital financial services, contributing to the broader goals of Digital India and financial inclusion. The government, financial institutions, and tech companies must collaborate to provide the tools, training, and support needed to overcome these challenges and promote the adoption of digital payment systems in rural Maharashtra.

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## UPI - An Innovative step for making Digital Payment Effective and factors affecting Consumer Perception On the use of UPI

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### 1. Abstract:

The National Payment Corporation of India (NCPI) launched the Unified Payment Interface (UPI), which is one of the most wonderful, modernized, and cost-effective inventions. The proliferation of smartphones, technological advancement, and effective internet communications have increased the importance of mobile payment services for smartphone users, financial institutions, and banks. The National Payment Corporation of India (NCPI) may have established a ground-breaking method of cash transfer through a virtual payment address, the Unified Payment Interface (UPI), in order to promote a paperless and cashless economy. For Indian shoppers, demonetization offered a unique forum for accepting digital payments. Following demonetization, government reforms pushed for widespread adoption of cashless transactions.

The repercussions of Demonetization have resulted in a massive increase in digital payment use. Digital Payments have been around since the 1980s, so it isn't a new technology; the soil growth is in the various technologies that are used to perform digital payments. This paper discusses the UPI (Unified

Payment Interface) digital payment technique, including its architecture, technologies, operations, parties involved in UPI transactions, benefits and challenges, and factors influencing consumer satisfaction. Concerning the use of UPI.

The buyer's view of digital payment has a significant and optimistic effect on digital payment adoption. Data will be collected using a standardized Questionnaire form and secondary data sources such as NPCI to understand customer perceptions and intentions about digital payment. Since 36 percent of the Indian population is between the ages of 16 and 28, primary data will be collected from students and younger audiences across the country.

**Keywords:** UPI, Digital Payments, Demonetization, Reliability Testing, NPCI, Exploratory Factor Analysis, Linear Regression.

### 2. Introduction:

The Unified Payments Interface (UPI) is a real-time payment system developed by India's National Payments Corporation to facilitate inter-bank transactions. The Reserve Bank of India regulates the interface, which works by instantly transferring funds between financial institution-owned mobile platforms.

India is unpredictably heading in the direction of digitization. The announcement of Demonetization by Prime Minister Narendra Modi on November 8, 2016, resulted in a major expansion of virtual free options in India. As a result, virtual charge companies take a risk with both hands in order to spread out their market share. For Indian clients, demonetization has created a unique forum for the acceptance of practically free as an alternative to coins. Mr. Narendra Modi, the Prime Minister of India, has advocated for the implementation of cashless transactions as part of the government's post-demonetization reforms. Demonetization took place on November 8, 2016, in one of the world's largest economies, with the aim of eradicating black money and making India a cashless

economy.

This provided a clear picture for many companies to develop mobile payment systems, such as wallets and UPI (united payment interface), which was developed by the National Payments Corporation of India (NPCI) (National payment corporation of India). Since then, we've seen a change in Indians' consumption patterns, with many opting for UPI transactions. And the factors that influence the use of UPI payments, such as protection, convenience, and so on.

### 3. Literature review-

The aim of this study was to learn about customer perceptions of UPI payments, including whether they are familiar with them and, if so, what factors encourage or discourage them from using them. According to the literature, UPI payment is a mechanism in which commercial transactions are carried out using electronic devices such as smartphones and UPI-enabled applications such as Gpay, Samsung Pay, PhonePe, and others. It's also a more advanced version of an electronic payment system that allows users to conduct money transactions quickly and easily.

It was discovered that one of their main concerns is protection and trust, which has an effect on their behavior when it comes to UPI Payment systems. Further, we attempted to understand how age influences users' intention to use, and discovered that although youth are interested in adopting new technology, older people are not. They are motivated by their own social group to adopt new technology, but this relationship could not be formed for either youth or the older generation in the case of the UPI payment system.

It was discovered that when it comes to merchants' intention to use UPI payment technology, variables such as compatibility and usability of service, consumer value addition, and customer value addition affect their behavioral intention significantly. In other words, for a retailer, utility of services means that they should

not only be cost-effective, but also generally embraced by their customers, because if this payment mechanism offers greater convenience than other forms of payment, both customers and merchants would be more likely to use it.

In terms of individual or non-merchant users, factors such as innovativeness, stress to use (which measures an individual's level of discomfort when using technology), and social influence were investigated, and it was discovered that high stress negatively correlated with user satisfaction, whereas social influence and recommendation are positively correlated with intention to use UPI Payment. Early adopters priorities ease of use and believe they have a thorough understanding of UPI-payment systems, whereas late adopters are tech-savvy and use UPI payment as a last resort.

We also tried to figure out how various factors influence user acceptance and recommendation of digital UPI Payment. According to current research, perceived technology protection, performance standards, and innovativeness all have a positive effect on digital UPI payment recommendation, implying that if a consumer believes the payment system is safe and meets his expectations, he is more likely to recommend it to others. The effect of personality traits and behavioral values on adoption behavior was also investigated, and it was discovered that both are very important for digital UPI payment adoption and use, but their impact on the pre-adoption stage and post-adoption stage is different. Further, we looked into the literature to learn more about UPI payment users' post-adoption behavior and what motivates them to keep using it. We discovered that the quality of service and system are both positively associated with confidence and satisfaction, implying that the higher the quality of service and system, the greater the users' trust and satisfaction with the UPI payment system. Furthermore, the flow is affected by the quality of information and service; if confidence, flow, and

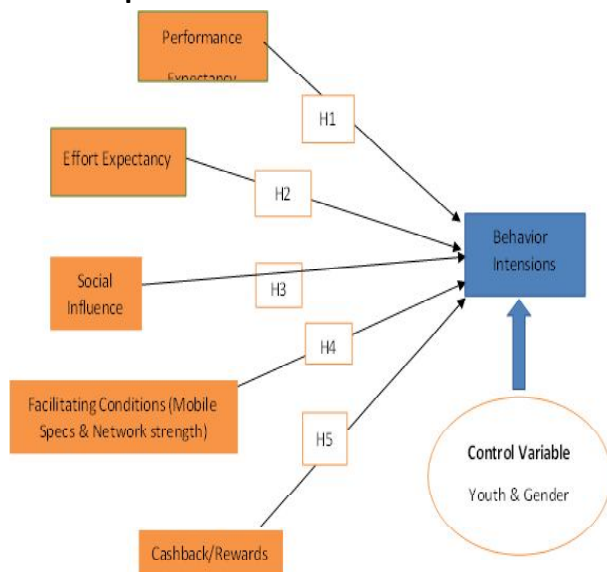
satisfaction are high, the customer will continue to use the current service.

Based on the above-mentioned literature, we propose an extended UTAUT2 model for conceptual modelling the factors that influence the adoption of UPI-based payment apps in India, based on our literature review.

#### 4. Research Objective

- The customer perception on adoption of UPI mode of payment.
- How significant the difference is perceived by respondents for various attributes of UPI on the basis of age of respondents.
- How significant the difference is perceived by respondents for various attributes of UPI on the basis of Performance Expectancy, Effort expectancy, Social influence etc of the respondents

#### 5. Conceptual Model



#### 4.1 Performance Expectancy

Performance Expectancy or PE - "Performance expectancy is the benefits and utilities (e.g., saving time and effort, efficiency, accessibility, customization, convenience) that could be obtained from using innovative channels" As regards the current study is concerned, Performance Expectancy highlights the usefulness of UPI Payment Applications for customers. Performance Expectancy also highlights as to how much a user of UPI Payment Application feels efficient or helped by the said UPI Payment Ap-

plications.

**Construct** should make the Consumers feel more productive to an extent as they can do their payment and banking tasks more quickly.

**H1:** Performance Expectancy is positively related to the intention to use UPI-based payment apps.

#### 4.2 Effort Expectancy:

Effort Expectancy or EE (Wang (2017) and Farooq (2017))- In the paper, Venkatesh (2003)

Effort Expectancy means "the extent of ease associated with the usage of a system" (p.450). "To accept a new technology, the basic criterion for the people is to check to what extent the new technology is easy to use apart from its positive value addition" (Alalwan,2017). It has been highlighted in prior studies that if a certain technology is easy and provides convenience, then it can affect individuals to take up the same Effort Expectancy means how easily can a person that is in our case a Management Student use an UPI payment application. According to the Effort Expectancy.

**Construct**, people should not face any problems or face only a few problems while using a technology; in our case using UPI payment applications by Age Groups.

**H2:** Effort Expectancy is positively related to the intention to use UPI-based payment apps.

#### 4.3 Social Influence:

Social Influence (SI) (Farah (2018) and Farooq (2017)) – This **Construct** refers to "the degree to which a person perceives that something important which others believe, that he or she should apply the new system" [Venkatesh (2003), p.451]. This construct means the way in which the habits of the people around a person can affect his or her habits. In this study, since we are focusing on different age groups, the Social Influence construct becomes all the more important because people of random age groups get affected by social influence in a different way, mostly. Thus, in such situations, the habit of other peers becomes a big reason which might or might not affect the usage of a technology which in our case is UPI Payment Applications. There is always a chance of individuals, especially students or youth to shift from a

non-socially acceptable technology to a socially acceptable one.

**H3:** Social Influence is positively related to the intention to use UPI-based payment apps.

#### 4.4 Facilitating Conditions:

The relationship between facilitating circumstances and a person's intention to do something. Facilitating software tools, hardware, technical support, and awareness of information technology in India (Taylor and Todd, 1995a, 1995b). When it comes to the use of any technology, the FC provides advice, assistance, and instruction. FC, according to Venkatesh et al. (2012), refers to the consumer's understanding of the help and services available to conduct behavior. When consumers can quickly access and use the internet and a computer, they adopt the use of electronic banking transactions (Joshua and Koshy, 2011). FC has a strong relationship with the need to use mobile communication technology.

**H4:** Facilitating Conditions are positively related to the intention to use UPI-based payment apps

#### 4.5 Cashback and rewards:

It was found that when the message contains incentives, the concentration of consumers on advertisements increases (Kim & Han, 2014). Previous research has concluded that the components of extrinsic motivation (taking values and goals as one's own) are internalized in the long run (Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2000). In this way, by using fines or incentives, customers can control the externally regulated actions internally (Ryan & Connell, 1989).

**H5:** Cashback/ Reward Motivation is positively related to the intention to use UPI-based payment apps.

#### 6. Research Methodology

This study was designed to use a quantitative methodological approach. The research instrument, a questionnaire, was created using similar theories and accepted by experts. The factors influencing the decision to use UPI payment in India were studied using a quantitative method in this research report. In this research, the primary source of data and knowledge was a survey questionnaire, as well as other trustworthy secondary sources including related jour-

nals, documents, and online databases.

**Survey instrument design:** The survey instrument was created based on previous research. Initially, the objects were adapted from pre-existing scales used in the literature. We made slight changes where appropriate to accommodate the Indian perspective on UPI payments.

| Construct               | Code | Questions                                                                                         |
|-------------------------|------|---------------------------------------------------------------------------------------------------|
| Performance Expectancy  | PE1  | I gain more time when I use UPI                                                                   |
|                         | PE2  | UPI optimizes my financial operations                                                             |
|                         | PE3  | UPI allows me to make my payments quicker                                                         |
|                         | PE4  | I will optimize my earnings using UPI                                                             |
| Effort Expectancy       | EE1  | Learning to use UPI payment is easy                                                               |
|                         | EE2  | It's easy to enter in the UPI payment app                                                         |
|                         | EE3  | It's easy to use the UPI payment service skilfully                                                |
|                         | EE4  | I do not have any doubts about what I'm doing when I'm using the service                          |
| Social Influence        | SI1  | My friends and family value the use of UPI payments                                               |
|                         | SI2  | The people that influence me use UPI payment                                                      |
|                         | SI3  | I find mobile payment trendy                                                                      |
|                         | SI4  | The use of UPI payment gives me professional status                                               |
| Facilitating Conditions | FC1  | I have the resources necessary to use mobile learning                                             |
|                         | FC2  | I have the know-how to use UPI payment                                                            |
|                         | FC3  | If I have any doubts about how to use the UPI payment service I do have a support line to help me |
|                         | FC4  | I have proper Network signal strength to complete UPI transaction                                 |
| Cashback & rewards      | CR1  | Cashback and reward encourage me to transact more through UPI                                     |
|                         | CR2  | Cashback and Reward makes me loyal to company and else any platform is fine for me                |
|                         | CR3  | Cashback and rewards ca be significant feature to switch my default UPI payment app               |

#### 7. Data Analysis:

| Coefficients                                                                                                                                                                                |                   |                             |                   |                            |             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------|-------------------|----------------------------|-------------|
| Model                                                                                                                                                                                       |                   | Unstandardized Coefficients |                   | Standardized Coefficients  |             |
|                                                                                                                                                                                             |                   | B                           | Std. Error        | Beta                       |             |
| 1                                                                                                                                                                                           | (Constant)        | 1.578                       | .359              |                            | 4.395 .000  |
|                                                                                                                                                                                             | PE                | .464                        | .063              | .453                       | 7.381 .000  |
|                                                                                                                                                                                             | EE                | .209                        | .063              | .202                       | 3.310 .001  |
|                                                                                                                                                                                             | SI                | .083                        | .074              | .063                       | 1.120 .265  |
|                                                                                                                                                                                             | FC                | .194                        | .064              | .184                       | 3.015 .003  |
|                                                                                                                                                                                             | CR                | -.288                       | .061              | -.264                      | -4.726 .000 |
|                                                                                                                                                                                             |                   |                             |                   |                            |             |
| a. Dependent Variable: BI – Behavioral Intention;<br>Note: PE- Performance Expectancy; EE- Effort Expectancy;<br>SI- Social Influence; FC- Facilitating Conditions; CR- Cashback & Rewards; |                   |                             |                   |                            |             |
| Model                                                                                                                                                                                       | R                 | R Square                    | Adjusted R Square | Std. Error of the Estimate |             |
| 1                                                                                                                                                                                           | .768 <sup>a</sup> | .590                        | .575              | .85874                     |             |

#### Model Summary

Predictors: (Constant), PE, EE, SI, FC, CR;

**H1:** Performance expectancy has a **Significant relationship** with the Behavioral Intention in using UPI payments with **Beta = 0.453, T-statistics = 7.381 and P value <= 0.05.**

**H2:** Effort expectancy has a **Significant relationship** on the Behavioral Intention in using UPI payments with **Beta = 0.202, T-statistics = 3.310**

and P value  $\leq 0.05$ .

**H3:** Social influence has **no positive relationship** with Behavioral intention associated with UPI payments with **Beta = .063, T-statistics = 1.120 and P value  $\geq 0.05$ .**

**H4:** Facilitating conditions has **a Significant relationship** with Behavioral intention associated with UPI payments with **Beta = 0.184, T-statistics = 3.015 and P value  $\leq 0.05$ .**

**H5:** Cashbacks & Rewards has **no positive effect** with Behavioral intention associated with UPI payments with **Beta = -.264, T-statistics = -4.726 and P value  $\leq 0.05$ .**

### 8. Findings:

The study aimed to develop a systematic model for measuring the impact of performance expectancy, effort expectancy, social influence, facilitating conditions (Mobile specs & Network strength), and Cashbacks & Rewards on consumers' behavioral intentions in order to better understand their perceptions of UPI payments. Performance expectancy, effort expectancy, facilitating conditions (Mobile specs & Network strength), and Cashbacks & Rewards have all been found to have a major effect on customer behavior in leading them towards digital payments (UPI). These following four factors which were significant in relation with behavioral intention accounted for approximately 57.5% (Adjusted R Square = 0.575) of the change in behavioral intention in the context of adopting & usage of UPI payments and the remaining impact might be dependent on the factors that we have not considered in our study.

### 9. Conclusion:

The aim of this study was to see how users perceive about adoption of UPI payments. To determine this, we have considered various factors such as performance expectancy, effort expectancy, social influence, facilitating conditions (Mobile specs & Network strength), and Cashbacks & Rewards on consumers' behavioral intentions.

With our study we conclude Performance expectancy, effort expectancy, facilitating conditions (Mobile specs & Network strength), and Cashbacks & Rewards found to have an impactful relationship with the behavioral intention of the users who prefer to adopt

and use UPI payments.

Therefore, we infer that users who wants a smooth payment experience, with least effort requirement & are also being facilitated by latest tech have enabled them to drive towards being more friendly with digital UPI payments while being more tolerant with this new mode of payments which have been introduced in Indian mainstream markets in the last five years.

### 10. Limitations and Scope for future research:

While the current study offers an affluence of information about users' perceptions to adopt UPI payments though it has some limitations.

The first limitation is that the data was collected through a questionnaire via Google survey due to COVID constraints and with a sample size of 74. So, future research can be done on a larger demography across the country and can also use exploratory methods such as focus group interviews, prescriptive techniques etc. for the collection and evaluation of data.

The second limitation here is, the data and perception which were inculcated in this study were from pre-covid and during covid eras. So, the next research could be conducted in the post covid era, which could give an impression on what was the compelling reason for people to shift from traditional methods of payments to a digital secured payments method (UPI) ie reasons like health concern over the exchange of currency etc.

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## Education and Training for Enhancing Digital Financial Literacy

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### ABSTRACT –

Financial literacy is the ability to make informed judgments and to take effective decisions regarding the use and management of money. An individual with digital financial literacy has the knowledge and skills to use digital devices to make better financial decision. People with proper financial literacy make better financial decisions and manage better than people without such training. A big improvement in financial knowledge of individuals is necessary. This is possible with appropriate financial education programs targeted at right people at right time.

**Keywords:** Digital Financial Literacy, Financial Education, Training,

### INTRODUCTION:

Digital literacy refers to developing or relearning the skills needed to use the Internet and adapt to the digital world. An individual with digital financial literacy has the knowledge and skills to use digital devices to make better financial decisions. The coming era is completely digital and if you stay behind in it, you will not be able to reap its benefits and others may cheat you. For this it is necessary to understand financial digital transactions. So education and training is most important thing for enhance digital financial literacy. Digital financial literacy training is not just a service but an inherent right

for consumers in low-income communities. Governments, financial institutions, and educational organizations must collaborate to ensure that every individual, regardless of their economic status, has the tools and knowledge needed to navigate the digital financial landscape confidently. By recognizing and fulfilling this right, we can contribute to a more inclusive and equitable financial future for all.

### OBJECTIVES OF THE STUDY:

- Digital financial literacy training provides individuals with the understanding needed to assess digital products, make sound choices, and protect themselves from potential risks associated with online transactions.
- Access to digital financial literacy training serves as a bridge across the digital divide that often separates low-income communities from the benefits of the digital financial ecosystem. It empowers individuals to participate actively in the digital economy.
- Digital financial literacy training provides individuals with the understanding needed to assess digital products, make sound choices, and protect themselves from potential risks associated with online transactions.
- Digital financial literacy training is a means to empower low-income communities to actively participate in economic activities, contributing to sustainable development goals.
- Improve Financial Decision-Making-Enable people to make informed financial choices regarding savings, investments, loans, and digital transactions.

### RESEARCH METHODOLOGY:

#### Primary Data:

**Surveys & Questionnaires:** Gather responses from individuals on their knowledge, awareness, and challenges related to digital financial literacy.

**Interviews & Focus Groups:** Conduct discussions with educators, financial experts, and participants to gain deeper insights.

**Workshops & Training Programs:** Observe and

assess the impact of training sessions on learners' digital financial skills.

### Evaluation Metrics

Pre- and post-training assessments to measure improvements in financial knowledge and digital skills.

Participant feedback and engagement levels in training programs.

Effectiveness of different teaching methodologies (online courses, workshops, practical sessions).

### Importance of Digital Financial Literacy:

Digital financial literacy is a critical necessity in India due to several key factors. Firstly, as India transitions rapidly into a digital economy, the adoption of digital financial services such as mobile banking, digital wallets, and online payment platforms has surged. This shift necessitates that individuals possess the requisite knowledge and skills to use these services effectively, securely, and efficiently.

**Enhancing Financial Inclusion:** Digital financial literacy plays a pivotal role in enhancing financial inclusion in India. A significant portion of the Indian population, particularly those in rural and underserved areas, lacks access to traditional banking services. Digital financial services provide an avenue for these individuals to engage with the financial system. Initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY) have opened over 450 million bank accounts, many of which are accessible via digital platforms. Digital financial literacy ensures that these new users can navigate and utilize digital financial services effectively, thereby fostering greater financial inclusion and economic participation.

**Empowering Informed Financial Decisions:** Informed financial decision-making is another crucial benefit of digital financial literacy. With the right knowledge and skills, individuals can better compare and select financial products and services, manage their money more effectively, and make informed decisions about investments

and savings. Understanding the nuances of digital financial products enables individuals to choose options that best meet their needs and financial goals.

**Protection against Fraud and Financial Crimes:** Digital financial literacy also serves as a bulwark against fraud and other financial crimes. As the use of digital financial services grows, so too does the incidence of cybercrime and financial fraud. In 2023, India saw a significant rise in phishing attacks and SIM swap frauds, targeting users of digital banking and payment platforms.

### Challenges of Digital Financial Literacy in India:

Digital financial literacy, defined as the ability to use digital financial services effectively and safely, is essential for fostering economic inclusion and growth. Despite significant strides in expanding digital financial services, India faces numerous challenges that hinder the widespread adoption and effective use of these services. These challenges can be broadly categorized into awareness, infrastructure, financial literacy, security concerns, language barriers, trust issues, and regulatory challenges.

- **Lack of Awareness:** Many individuals in India, particularly in rural areas, remain unaware of digital financial services and their benefits. This gap in awareness hinders the adoption of digital financial services, limiting economic opportunities and financial inclusion.

- **Limited Digital Infrastructure:** Access to necessary digital infrastructure, such as smartphones, internet connectivity, and digital payment systems, is still limited in many parts of India. Rural and remote areas are particularly affected, where basic digital amenities are often lacking, exacerbating the digital divide.

- **Low Levels of Financial Literacy:** A significant portion of the Indian population has limited understanding of basic financial concepts such as interest rates, credit scores, and savings. This low level of financial literacy impedes individu-

als' ability to make informed decisions about digital financial services, further entrenching economic disparities.

- **Dependency on Smartphones:** The reliance on smartphones for UPI transactions excludes individuals who do not own these devices or are uncomfortable using digital technology. This dependency poses a significant barrier to universal digital financial literacy.

- **Limited Language Support:** Digital financial services often rely heavily on English, which is not widely spoken or understood in many parts of India. The lack of multilingual support creates a language barrier, preventing non-English speakers from effectively accessing these services.

### **How Digital Literacy and Financial Literacy Secure a Brighter Future**

Both digital literacy and financial literacy in schools are essential skills that empower students to take control of their lives. In a rapidly changing job market, digitally literate employees have a clear advantage, as technology skills are highly sought after by employers across industries. From basic proficiency in using digital tools to advanced skills in areas such as coding or data analysis, digital literacy enhances students' employability and career prospects.

Similarly, financial literacy in schools serves as a safety net for the future. Financially literate students are less likely to encounter issues related to debt, overspending, or financial insecurity. Financially literate individuals understand the importance of saving, investing, and planning for long-term goals, which are key to financial stability and independence. By equipping students with financial literacy skills, schools ensure that they are better prepared to handle life's financial challenges, whether it's financing their education, buying a home, or starting a business.

In addition to structured courses, schools can adopt experiential learning methods to make digital literacy and financial literacy

engaging. For instance, financial literacy can be taught through budgeting exercises, where students simulate managing expenses within a fixed income. Digital literacy can be reinforced through project-based learning, such as creating digital presentations or coding simple apps, allowing students to apply their skills in meaningful ways. Incorporating digital literacy and financial literacy in schools' education is a powerful way to prepare students for success in the modern world. These subjects are more than just skills; they are pathways to independence, security, and opportunity. By providing students with the tools they need to navigate technology and manage their finances, schools can empower them to make informed decisions, pursue meaningful careers, and lead fulfilling lives.

### **Building Strong Foundations through School Curriculum**

Integrating digital literacy and financial literacy in school curriculum builds a strong foundation for students' lives. For digital literacy, foundational skills such as operating devices, using productivity tools, and understanding internet safety can be introduced as early as elementary school. As students progress, they can learn more advanced skills like coding, cyber security, and digital content creation, which open doors to high-demand careers in technology and beyond. Similarly, financial literacy should start with basic money management concepts, such as distinguishing between needs and wants or understanding the importance of saving. As students grow, they can move on to topics like budgeting, credit, loans, and investments. This tiered approach enables students to gradually deepen their understanding, applying concepts to real-life situations as they gain more knowledge and experience.

### **FINDINGS:**

Many individuals, especially in rural areas, lack basic knowledge of digital payment methods, mobile banking, and online financial services.

A significant percentage of users are unaware of cyber security best practices, making them vulnerable to online fraud, phishing, and identity theft.

Existing financial literacy programs often focus on theoretical knowledge rather than hands-on experience with digital financial tools.

Poor digital infrastructure and lack of internet access hinder the adoption of digital financial literacy programs in underprivileged regions.

Some individuals, particularly older generations, prefer cash transactions due to a lack of trust in digital financial systems.

Government campaigns like Digital India and financial literacy programs by banks have improved awareness, but more efforts are needed for widespread adoption.

Training modules are often generic and do not cater to different demographics such as students, working professionals, or small business owners.

#### **SUGGESTIONS:**

Conduct nationwide awareness programs using social media, TV, and local community events to educate people about digital financial literacy.

Integrate cyber security training into digital financial literacy programs to teach safe transaction practices and fraud prevention techniques.

Organize workshops where individuals can actively use digital wallets, UPI, net banking, and budgeting apps under expert guidance.

Develop mobile-based learning solutions and collaborate with local community centers to reach rural populations.

Banks, fintech companies, and educational institutions should work together to create comprehensive digital financial literacy programs.

Create customized learning programs for different groups like students, senior citizens, small business owners, and daily wage earners.

ers.

Use e-learning platforms, mobile apps, and interactive videos to make financial education engaging and accessible.

Implement more incentives and subsidies for digital transactions, especially for marginalized communities, to encourage adoption.

#### **CONCLUSION:**

Digital financial literacy is essential for everyone. When individuals become aware, confident, knowledgeable, and responsible in using digital financial tools, their ability to contribute and benefit increases. This not only aids personal development but also fosters growth for the country and the world at large. This study found that digital financial literacy is crucial in India for promoting financial inclusion, especially for underserved and marginalized communities. It emphasized the importance of digital financial literacy in reducing the costs and inconveniences of traditional banking services and encouraging the adoption of digital financial services. However, the study also identified several challenges in promoting digital financial literacy in India. These challenges include the digital divide, with many people lacking access to digital infrastructure and services, and a general lack of awareness and understanding of digital financial services. These efforts should aim to improve access to digital infrastructure and provide education and training on digital financial services. Additionally, the study highlights the need for collaboration between the government, financial institutions, and technology providers to develop and implement effective strategies for enhancing digital financial literacy levels.

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## The impact of internet connectivity and smartphone penetration in rural areas

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**Abstract** - The rapid expansion of internet connectivity and smartphone penetration in rural areas has brought transformative changes across multiple sectors, including education, healthcare, agriculture, and commerce. This paper explores how digital access empowers rural communities by enabling online learning, telemedicine, financial inclusion, and e-commerce opportunities. Farmers benefit from real-time market and weather updates, while small businesses leverage digital platforms for growth. However, challenges such as digital literacy, infrastructure gaps, and affordability remain barriers to full digital integration. Addressing these challenges through improved connectivity, education, and policy support can bridge the rural-urban digital divide, fostering economic and social development in rural regions.

**Keywords:** internet connectivity smartphone and rural area

### Introduction:

The rise of internet connectivity and smartphone penetration has transformed various aspects of life worldwide. However, rural areas often lag in technological advancements due to infrastructure limitations, high costs, and digital literacy gaps. The expansion of internet access and smartphones in rural regions has the potential to bridge the digital divide, providing

opportunities for education, healthcare, business, and governance. This article explores the impact, advantages, challenges, and solutions associated with internet connectivity and smartphone usage in rural communities.

### **Objectives of Studying the Impact of Internet Connectivity and Smartphone Penetration in rural areas:**

**1. Assess Digital Inclusion** – Analyze how increased internet connectivity and smartphone penetration contribute to bridging the digital divide between rural and urban areas.

**2. Evaluate Socio-Economic Growth** – Examine how access to the internet and smartphones influences economic activities, such as agriculture, e-commerce, and small businesses, in rural areas.

**3. Enhance Educational Opportunities** – Investigate the role of internet connectivity and smartphones in improving access to digital learning resources, online courses, and virtual classrooms for rural students.

**4. Improve Healthcare Access** – Study how telemedicine and health-related mobile applications help rural population's access better healthcare services.

**5. Strengthen Financial Inclusion** – Analyze the adoption of digital financial services, including mobile banking, UPI transactions, and online payments, to enhance financial inclusion in rural communities.

**6. Boost Employment and Entrepreneurship** – Explore how internet access and smartphones create new job opportunities, enable digital entrepreneurship, and provide access to gig economy platforms.

**7. Improve Government Service Accessibility** – Assess how rural populations use smartphones to access e-governance services, welfare schemes, and other government programs.

**8. Enhance Communication and Social Connectivity** – Study how smartphone penetration helps rural populations stay connected with family, friends, and the global community through

social media and messaging apps.

**9. Identify Challenges and Barriers** – Identify key challenges such as affordability, digital literacy, and network infrastructure that may hinder the positive impact of internet connectivity in rural areas.

**10. Suggest Policy Recommendations** – Provide insights and policy recommendations to governments and stakeholders to enhance the effectiveness of digital penetration in rural development.

### **Impact of Internet Connectivity and Smartphone Penetration in Rural Areas:**

The availability of internet services and smartphones in rural areas has significantly influenced multiple sectors:

#### **1. Education and Skill Development**

Online learning platforms enable students to access quality education.

Vocational training programs help individuals improve their employability.

#### **2. Healthcare and Telemedicine**

Rural communities can consult doctors remotely through telemedicine services.

Mobile health applications provide guidance on disease prevention and maternal care.

#### **3. Economic Growth and Financial Inclusion**

Digital banking and mobile payment services facilitate financial transactions.

Farmers and small businesses can access online markets, increasing their customer base.

#### **4. Agricultural Advancement**

Farmers receive real-time updates on weather, market prices, and modern farming techniques.

Government subsidy programs and loan applications become more accessible online.

#### **5. Social Connectivity and Awareness**

Rural populations can stay informed about government schemes, news, and employment opportunities.

Social media platforms promote civic engagement and community development.

**Advantages of Internet and Smartphone Usage in Rural Areas:**

- **Improved Access to Information:** Rural communities can access vast amounts of information, enhancing decision-making.
- **Employment Opportunities:** The gig economy, remote work, and digital marketing create new job prospects.
- **Enhanced Government Services:** Digital platforms enable efficient delivery of e-governance and welfare schemes.
- **Cost Savings and Convenience:** Online transactions and communication reduce the need for physical travel.

**Disadvantages of Internet and Smartphone Usage in Rural Areas:**

Despite the numerous benefits of internet connectivity and smartphone penetration in rural areas, several challenges and disadvantages must be considered:

**1. Limited Digital Literacy**

- Many rural residents, especially older generations, struggle to use smartphones and online services effectively.
- Lack of digital education increases vulnerability to scams, misinformation, and cyber threats.

**2. High Cost of Internet and Smartphones**

- Smartphones, internet subscriptions, and data plans can be expensive for low-income families.
- Limited competition among service providers results in high costs and poor network quality.

**3. Poor Network Connectivity and Infrastructure**

- Many rural areas still lack reliable internet access due to weak infrastructure.
- Frequent power outages disrupt connectivity, limiting the usability of online services.

**4. Cyber security and Privacy Risks**

- Rural users are more prone to online fraud, identity theft, and phishing attacks due to a lack of cyber security awareness.

- Personal data can be misused due to weak passwords and unsecured internet connections.

**5. Social and Psychological Effects**

- Excessive smartphone usage can lead to addiction, reducing productivity and real-life social interactions.
- Increased exposure to social media can contribute to mental health issues like anxiety, stress, and depression.

**6. Spread of Misinformation and Fake News**

- Many rural users rely on social media for news, making them susceptible to false information and propaganda.
- Misinformation can cause panic, confusion, and social unrest in communities.

**7. Economic Challenges**

- Traditional businesses may struggle to compete with digital platforms, affecting local economies.
- Small-scale traders and farmers who lack digital skills may find it difficult to adapt to e-commerce and online markets.

**8. Cultural and Social Changes**

- The influence of digital content may lead to the erosion of traditional customs, languages, and values.
- Rural youth may become more inclined to migrate to urban areas, leading to depopulation and weakening of rural communities.

**9. Health Concerns**

- Prolonged screen time can cause vision problems, headaches, and sleep disturbances.
- Excessive smartphone use can lead to a sedentary lifestyle, increasing the risk of obesity and other health issues.

**10. Digital Divide and Inequality**

- Even with internet access, not all rural residents can afford smartphones or have the skills to use digital services effectively.
- This gap creates inequalities in access to education, job opportunities, and government services.

**Challenges and Barriers:**

Despite its benefits, the digital transformation in rural areas faces several challenges:

**1. Limited Infrastructure:** Many remote areas still lack stable internet connections and mobile networks.

**2. High Costs:** Smartphones, data plans, and internet-enabled devices may be unaffordable for low-income families.

**3. Digital Literacy Gap:** Many rural users are unfamiliar with online services and face difficulties navigating digital platforms.

**4. Security Risks:** Cyber fraud, misinformation, and data privacy concerns pose risks to rural users.

**5. Energy Supply Issues:** Frequent power shortages hinder continuous internet access.

#### **Suggestions for Improvement:**

To maximize the benefits of digital connectivity in rural areas, governments and private organizations should consider the following measures:

- **Infrastructure Development:** Expanding fiber-optic networks, 5G services, and public Wi-Fi hotspots.

- **Affordable Internet and Devices:** Offering subsidies and low-cost smartphone plans for rural populations.

- **Digital Literacy Programs:** Training individuals to use digital services safely and effectively.

- **Localized Digital Content:** Developing apps and websites in regional languages for better accessibility.

- **Public-Private Partnerships:** Encouraging telecom companies and NGOs to invest in rural digital development.

#### **Conclusion:**

Internet connectivity and smartphone penetration in rural areas present a transformative opportunity to drive socio-economic development. While challenges exist, strategic investments in infrastructure, education, and affordability can unlock the full potential of digital technology. Bridging the digital divide will empower rural communities, fostering a more inclusive and connected world.

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## E-commerce Adoption by Women Entrepreneurs: Challenges and Opportunities

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### Abstract:

E-commerce has revolutionized the trade scenario, with entrepreneurs, especially giving women, a new path to growth and stability. Despite their ability, female entrepreneurs face many challenges in using and integrating themselves into their businesses. This article examines challenges and opportunities related to the use of e-commerce of female entrepreneurs, who focus on technical, economic, social and regulatory obstacles. It also highlights the benefits of e-commerce, such as extended market access, cost savings and flexibility. In addition, the paper highlights the role of digital platforms, mobile commerce, and social media in empowering women entrepreneurs. It also examines the strategies used to study and overcome obstacles faced by successful women-led e-commerce ventures. In addition, it addresses the importance of mentorship, networking and capacity programs to promote digital entrepreneurship among women. This article concludes with recommendations for decision makers, stakeholders and female entrepreneurs to increase e-commerce, ensuring the inclusive economic growth and digital authority for women-led businesses.

**Keywords:** E-commerce, Women Entrepreneurs, Challenges, Opportunities, Digital Business, Online Marketing

### 1. Introduction:

Women entrepreneurs played an important role in economic development by doing jobs, promoting innovation and contributing to

inclusive development. With a digital revolution, e-commerce has emerged as a gaming exchanger, enabled companies to work beyond geographical obstacles and now a comprehensive customer base. This gives women entrepreneurs opportunities to start and scale companies with low operating costs and increased flexibility. Despite its ability, women entrepreneurs often encounter obstacles to using e-commerce, including limited digital literacy, inadequate economic resources, cultural criteria and complex regulatory structures.

In addition, challenges such as limited access to technology, lack of mentorship and social expectations prevent their participation in the digital economy. Many female affiliated companies are struggling to navigate digital marketing, logistics and cyber security, making it difficult to maintain long-term growth. However, with the right support systems-such as digital training, financial assistance and improvement of policy can remove these obstacles and benefit from e-commerce to expand companies. The purpose of this study is to analyze the challenges that women entrepreneurs face in the adoption of e-commerce and find out opportunities that can facilitate the success of the rapidly developed digital marketplace.

### 2. Objectives of Study:

- To check the challenges that women entrepreneurs face in using e-commerce.
- Identify opportunities provided by e-commerce for women entrepreneurs.
- To suggest strategies from women entrepreneurs to use e-commerce.

### 3. Challenges Faced by Women Entrepreneurs in E-commerce Adoption

#### 3.1 Technical obstacles:

Many women entrepreneurs struggle with digital literacy and limit their ability to effectively use e-commerce platforms. Lack of access to online marketing, website development and cyber security prohibits their ability more. For example, a woman in the countryside cannot have the skills to market her products online or protect the business from cyber dangers.

#### 3.2 Economic obstacles:

Women face challenges in gaining inad-

equate security, credit history and in financial institutions to make money due to gender profits. E-commerce requires investments in the development of websites, digital marketing and logistics, which can be financially difficult. For example, it can be difficult to obtain loans for online store setups because of prejudice from financial institutions.

### 3.3 Social and cultural obstacles:

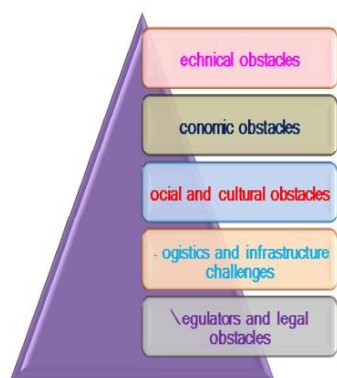
Traditional gender roles often limit women's business participation, limiting their time and resources with family responsibility and social expectations. Lack of support systems makes it challenging for women to devote e-commerce. In some cultures, for example, women are expected to prioritize home nursing on entrepreneurial efforts.

### 3.4 Logistics and infrastructure challenges:

Women entrepreneurs in rural or semi-urban areas often face poor internet connection, high shipping costs and disable supply chains. These challenges prevent their ability to operate effectively in e-commerce rooms. For example, a woman who runs an online store may struggle with a slow internet speed that delays order processing.

### 3.5 Regulators and legal obstacles:

Navigation of rules for e-commerce, including taxation, digital payments and data privacy, can be composed and challenging for female entrepreneurs. Limited access to legal guidance makes compliance more difficult. For example, a woman in a small company may struggle with an online sale or understand the tax law related to safe digital payment systems.



Challenges Faced by Women Entrepreneurs in E-commerce

## 4. Opportunities for Women Entrepreneurs in E-commerce

### 4.1 Extensive market access:

E-commerce allows women entrepreneurs now customers beyond their local markets, which enables business expansion without the need for physical stores. It allows opportunities to target global markets, which increases sales capacity. For example, a woman who sells handmade jewelry can attract customers from different countries, and expand her business to a large extent beyond her local region.

### 4.2 Cost -effective trading model:

Online businesses reduce operating costs by eliminating the requirement of physical space, reducing goods costs and reducing middlemen. This makes it cheaper for women to start and run their businesses with minor pre-investments. For example, a woman who runs an online clothing store can save a physical store on rent and costs.

### 4.3 Flexibility and balance between work and life:

E-commerce gives women flexibility to manage their businesses from home, making it easier to balance work and family responsibility. This flexibility is beneficial for women with particularly careful duties, as they can determine their hours and manage tasks around their personal obligations. For example, a mother can run an online bakery that takes care of her children at home.

### 4.4 Access to digital marketing tools:

Social media and digital marketing tools provide cost -effective methods for female entrepreneurs to market their businesses, create brands and get in touch with customers. These platforms also allow targeted marketing, which can help women's businesses reach the right audience. For example, Instagram ads can help a woman owned by cosmetics to contact beauty enthusiasts in different fields.

### 4.5 Government and institutional support:

Many governments and organizations provide financial assistance, training programs and policy assistance to encourage female entrepreneurs in e-commerce. These initiatives often focus on reducing the obstacles that women face in reaching capital and resources. For example, women can apply for grants, mentoring programs or low-set loans, especially designed to support female anchors online.



## 5. Strategies to Enhance E-commerce Adoption Among Women Entrepreneurs:

### 5.1 Digital literacy and skill development:

Digital literature programs, online marketing training and giving cyber security awareness can strengthen women entrepreneurs to carry out trust in e-commerce rooms. Providing continuous support and mentorship can ensure that women continue to build and increase their digital skills over time.

### 5.2 Access to financial assistance and credit:

Governments and financial institutions should introduce gender-sensitive loan schemes, grants and credit facilities with low B-onion to support women entrepreneurs in e-commerce. Such schemes will also help to bridge gender differences in business funds and create higher

-level playgrounds.

### 5.3 Consciousness and cultural changes:

Encouraging social acceptance of women's entrepreneurship through awareness campaigns and success stories can help break cultural obstacles. Changing social conditions can lead to strong support networks for women entrepreneurs, and promote a more inclusive business environment.

### 5.4 Improving infrastructure:

Investment in better internet connection, cheap logistics and effective supply chain solutions can facilitate even e-commerce operation. This will not only improve access to markets, but will also reduce operating costs for women entrepreneurs in remote areas.

### 5.5 Political Reforms and Legal Aid:

Securing e-commerce rules, providing legal aid and ensuring transparent politics can encourage more women entrepreneurs to embrace digital activities. A clear and extra regulatory structure will increase confidence and reduce obstacles for women starting online businesses.

## 6. Conclusion and Recommendations:

E-commerce provides important opportunities for female entrepreneurs, but challenges such as technical, economic, cultural and regulatory barriers must be addressed. By increasing digital literacy, providing financial help, promoting gender politics and improving infrastructure, stakeholders can create a competent environment for female entrepreneurs in e-commerce. Governments, private sector institutions and social organizations should work together to bridge the gender difference in digital entrepreneurship and unlock the entire potential of e-commerce companies led by women. In addition, continuous efforts to raise awareness, offer mentoring programs and create more money opportunities, ensure continuous development and long-term success for women at this site. Strengthening women in e-commerce not only improves economic growth, but also promotes

greater equality in global trade ecosystems.

When women thrive, the business blooms. Now it is time to invest in women entrepreneurs, not just their own for their success - this is a success that enriches societies, economies and the world as in general. Let's look at the changes that makes their progress.

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## The Role of Digital Financial Literacy and Information Technology in Enhancing Financial Inclusion

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#### Abstract

Digital financial literacy (DFL) is a crucial skill in the modern economy, particularly with the rapid expansion of digital financial services. The role of information technology (IT) in promoting financial literacy and inclusion has become increasingly vital, especially as more individuals gain access to digital financial tools. This paper explores how digital financial literacy, coupled with advances in IT, enhances financial inclusion by empowering individuals to make informed financial decisions. Through a comprehensive review of existing literature and empirical data collected through surveys and interviews, this research demonstrates the connection between digital financial literacy and financial inclusion. It further emphasizes the importance of IT infrastructure in ensuring equitable access to financial services and proposes recommendations for improving financial education. This paper concludes that enhancing digital financial literacy through targeted education and improving IT infrastructure can significantly

contribute to broader financial inclusion.

**Keywords:** Digital Financial Literacy, Information Technology, Financial Inclusion, Personal Finance Management, Digital Economy, Financial Services

### Introduction

As the digital economy continues to grow, digital financial literacy (DFL) has become an essential skill for individuals worldwide. The rapid advancement of information technology (IT) has enabled people to access financial services online, providing them with more control over their financial decisions. However, despite the widespread adoption of digital financial tools, a significant portion of the population remains financially excluded, largely due to insufficient digital financial literacy. Digital financial literacy refers to the ability to use digital tools and technologies to manage financial tasks such as saving, budgeting, investing, and accessing financial products and services. While IT infrastructure plays a crucial role in providing access to financial services, an individual's ability to use these services effectively depends on their level of digital financial literacy.

The importance of digital financial literacy is particularly evident in the context of financial inclusion, which refers to the access of individuals to a wide range of affordable and accessible financial services. As digital financial services, such as mobile banking, online payments, and digital wallets, become increasingly common, those without adequate digital financial literacy are at risk of being excluded from these essential tools. This research paper aims to explore the relationship between digital financial literacy, IT, and financial inclusion, and offers recommendations for promoting digital financial literacy to ensure equitable access to financial services.

### Research Objectives:

1. To examine the relationship between digital financial literacy and financial inclusion.
2. To explore the role of information technology

in enhancing access to financial services.

3. To provide recommendations for improving digital financial literacy education to promote better financial management and inclusion.

### Research Methodology

This research adopts a **mixed-methods approach**, combining both qualitative and quantitative research techniques. The study collects both primary data through surveys and interviews and secondary data from existing literature.

### Literature Review:

A review of relevant literature was conducted to understand the relationship between digital financial literacy and financial inclusion. The literature includes scholarly articles, government reports, and publications by international organizations, such as the World Bank, European Commission, and International Monetary Fund, that discuss the role of digital tools in financial services and the barriers to financial literacy.

### Primary Data Collection:

**1. Survey:** A survey was conducted with 500 participants from various socio-economic backgrounds. The survey aimed to assess their level of digital financial literacy and their usage of digital financial services. The questions focused on the participants' awareness of digital financial tools, how frequently they used these tools, and their understanding of basic financial concepts, such as saving, budgeting, and investing. The survey also examined demographic factors such as income level, age, education, and geographic location to identify trends in digital financial literacy.

**2. Interviews:** In-depth interviews were conducted with 30 participants. These interviews sought to gain a deeper understanding of the challenges participants face in managing their finances digitally. The interviews also explored the participants' views on the accessibility of digital financial services and the support they need to improve their digital financial literacy.

Participants were chosen from a diverse range of backgrounds, including rural and urban areas, to capture a variety of perspectives.

#### Data Analysis:

**1. Descriptive Statistics:** Descriptive statistics were used to summarize and categorize the survey data. Key variables, such as income, education, and digital financial literacy, were analyzed to identify patterns and trends. The analysis also included a comparison of urban and rural populations to identify any disparities in digital financial literacy and access to IT infrastructure.

**2. Thematic Analysis:** Thematic analysis was employed to examine the interview data. This method involved coding the interview responses and identifying recurring themes related to digital financial literacy, IT infrastructure, financial behavior, and financial inclusion. The analysis also looked for differences in experiences based on age, gender, and geographical location.

#### Survey Results:

• **Digital Financial Literacy Levels:** Of the 500 respondents, approximately 70% had access to mobile phones, and 60% regularly used online banking or mobile payment applications. However, when tested on their understanding of digital financial tools, only 35% of the respondents demonstrated a high level of digital financial literacy. The majority of respondents could perform basic tasks like transferring money, checking account balances, and using mobile wallets. However, fewer respondents were familiar with more advanced functions, such as budgeting apps, investment platforms, or online loan applications.

• **Income and Education:** Digital financial literacy was strongly correlated with income and education levels. Respondents with higher levels of education and income were more likely to be digitally literate in managing their finances. Specifically, 75% of respondents with a university degree demonstrated a high level of financial literacy compared to just 30% of those with only a high school education. Similarly, individu-

als in higher income brackets (above \$40,000 annually) were more familiar with digital financial services compared to those earning lower incomes.

• **Geographical Disparities:** A notable disparity was observed between urban and rural areas. While 65% of respondents in urban areas reported using digital financial tools regularly, only 40% of respondents from rural areas used these tools. The main barriers to digital financial literacy in rural areas included limited internet access, low mobile network coverage, and a lack of financial education. Rural respondents also reported a lack of support in understanding digital financial services and managing personal finances digitally.

#### Interview Findings:

• Many interviewees expressed frustration with their ability to manage finances digitally. Those who lacked digital financial literacy often made poor financial decisions, such as missing bill payments, accumulating debt, or underutilizing savings accounts. Participants also highlighted a lack of trust in digital financial platforms, citing concerns about security and fraud. These concerns were especially prevalent among older participants who had limited experience with technology.

• IT infrastructure, particularly internet access and mobile phone penetration, was identified as a key determinant of digital financial literacy. Urban participants generally had access to reliable internet and mobile networks, which made it easier to access and use digital financial services. In contrast, rural participants faced frequent issues with internet connectivity and network coverage, making it difficult for them to access financial services.

• Many interviewees, particularly those from underserved communities, expressed a desire for more financial education. They emphasized the need for practical, hands-on training that would help them understand how to use digital tools for budgeting, saving, and invest-

ing. Participants suggested that educational resources should be accessible in local languages and tailored to the specific needs of different age groups.

### Findings

1. There is a strong relationship between digital financial literacy and financial inclusion. Individuals with higher levels of digital financial literacy are more likely to access a wider range of financial services, including loans, insurance, and investment products. In contrast, those with lower digital literacy levels are often excluded from these services, reinforcing socio-economic inequalities.
2. Information technology has played a pivotal role in improving access to financial services, especially for marginalized communities. Mobile banking, for instance, has allowed individuals in rural areas with limited access to physical banking infrastructure to manage their finances. Furthermore, digital financial services offer convenience and flexibility, enabling users to access their accounts and perform financial transactions at any time and from anywhere.
3. Despite the widespread use of digital financial tools, there are significant gaps in digital financial literacy. Many individuals, particularly those from lower-income backgrounds, rural areas, and older age groups, lack the skills necessary to use digital financial services effectively. These gaps are exacerbated by limited access to digital literacy programs and educational resources.
4. IT infrastructure is a key enabler of digital financial literacy. Inadequate infrastructure, such as slow internet speeds and limited mobile network coverage, hinders access to digital financial services. Moreover, the lack of widespread access to smartphones and computers in certain regions further exacerbates the digital divide.

### Suggestions

1. Financial education should be incorporated into the curriculum at all educational levels.

- Schools and universities should offer courses that teach students how to manage their finances digitally, including using budgeting apps, online banking, and investment platforms. This would ensure that future generations are prepared to navigate the digital financial landscape.
2. Governments and financial institutions should design targeted financial education programs for vulnerable groups, including the elderly, low-income individuals, and rural populations. These programs should focus on practical skills, such as how to use mobile banking, set up savings accounts, and avoid digital fraud. The content should be culturally relevant, easy to understand, and accessible in local languages.
3. Governments and private companies should work to improve IT infrastructure in underserved areas. This includes expanding internet access, improving mobile network coverage, and providing affordable smartphones to low-income individuals. Public-private partnerships could help make these improvements more cost-effective and efficient.
4. Public awareness campaigns should be launched to educate individuals about the benefits and risks of digital financial services. These campaigns should also emphasize the importance of cybersecurity, teaching individuals how to protect themselves from fraud and identity theft.

### Conclusion

Digital financial literacy and information technology are essential components in achieving financial inclusion. The widespread adoption of digital financial tools has the potential to empower individuals to manage their finances more effectively and participate in the formal economy. However, significant gaps in digital financial literacy persist, particularly among low-income individuals, the elderly, and those in rural areas. Bridging these gaps requires targeted education programs, improvements in IT infrastructure, and greater public awareness of digital financial services. By fostering digital

financial literacy and ensuring equitable access to technology, governments and financial institutions can promote financial inclusion, reduce poverty, and empower individuals to make informed financial decisions.

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## Digital Financial Literacy and Today's youth

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### Abstract:

In the rapidly evolving digital age, financial literacy has become increasingly essential, particularly for today's youth who are navigating the complexities of digital finance. This paper explores the importance of digital financial literacy among young people and investigates the challenges and opportunities they face in the context of modern financial tools, such as digital banking, online investing, crypto currency, and financial management apps. It evaluates the level of digital financial literacy among youth, identifies the factors that influence it, and examines the role of education, social media, and peer networks. The paper also highlights how digital financial literacy can help youth make informed financial decisions, reduce financial risks, and foster long-term economic well-being. The research methodology involves a survey-based approach, gathering data from a sample of young individuals aged 18-30, with an analysis of their knowledge, behavior, and attitudes toward digital financial tools. Findings indicate a significant gap in digital financial literacy, but with strong potential for improvement through targeted educational programs and increased awareness. Suggestions for bridging this gap are provided, focusing on the integration of digital financial education into formal curricula, the role of digital platforms, and parental involvement in teaching financial concepts. The conclusion emphasizes the need for a collabo-

rative effort to equip youth with the skills required to navigate the digital financial landscape responsibly and confidently.

**Keywords:** Digital Financial Literacy, Youth, Financial Tools, Digital Banking, Online Investing, Crypto currency, Financial Education, Economic Well-being.

**Objectives:**

1. To assess the current level of digital financial literacy among today's youth.
2. To explore the impact of digital financial tools on the financial decision-making processes of young people.
3. To identify the key factors influencing digital financial literacy in young individuals, including education, media, and peer networks.
4. To evaluate the effectiveness of existing financial literacy programs targeted at youth.
5. To provide suggestions for improving digital financial literacy among young people, focusing on education, digital platforms, and community involvement.

**Research Methodology:**

This research follows a quantitative approach using a survey to gather data from a sample of young individuals aged 18-30. The survey focuses on understanding their knowledge, attitudes, and behaviors toward various digital financial tools such as mobile banking apps, online investment platforms, and crypto currency. The questionnaire includes multiple-choice and Likert-scale questions to measure levels of digital financial literacy, including understanding financial concepts, usage of digital tools, and decision-making practices. The survey is distributed through online channels to reach a wide demographic and ensure a representative sample of today's youth. Data analysis is conducted using descriptive and inferential statistical methods to identify patterns, correlations, and significant factors that influence digital financial literacy.

**Findings:**

1. **Low Awareness of Key Concepts:** A large

portion of respondents demonstrated limited understanding of fundamental financial concepts, such as credit scores, investment strategies, and budgeting tools, though they frequently use digital financial tools.

**2. Increased Usage of Digital Financial Tools:** Despite limited financial literacy, most youth actively use digital platforms like mobile banking, online payment apps, and crypto currency exchanges, often driven by convenience rather than informed decision-making.

**3. Disparity in Digital Literacy:** There is a noticeable gap in digital financial literacy based on educational background and socioeconomic status. Higher-income individuals and those with formal education in finance tend to exhibit higher levels of digital financial understanding.

**4. Influence of Social Media and Peer Networks:** Youth are significantly influenced by social media trends and peer discussions when making financial decisions, but these sources often prioritize speculative and short-term financial gains over long-term planning.

**5. Lack of Formal Financial Education:** Many young individuals reported not having received formal education in digital financial literacy, pointing to the need for integrating financial education into school curricula.

**Suggestions:**

**1. Integration of Financial Literacy in Education Systems:** Schools and universities should incorporate digital financial literacy into their curricula to ensure that students understand how to navigate the digital financial world. Practical training in budgeting, online banking, and investing should be included.

**2. Government and Private Sector Partnerships:** Collaboration between governments, financial institutions, and tech companies can create programs that focus on financial education, providing free online courses, webinars, and resources targeted at young people.

**3. Role of Social Media and Influencers:** Influencers and social media platforms can play

a critical role in spreading awareness of digital financial literacy. Collaborations with financial experts to promote responsible financial practices could be beneficial.

**4. Parental Involvement and Family Education:** Parents should be encouraged to discuss financial topics with their children, particularly in the context of digital tools. Family-based financial literacy programs can help bridge the knowledge gap.

**5. Financial Literacy Campaigns:** Financial institutions should lead awareness campaigns aimed at educating youth on the risks and benefits of digital finance, emphasizing the importance of making informed, long-term decisions over impulsive ones.

**Conclusion:**

Digital financial literacy is crucial for today's youth, given the increasing reliance on digital platforms for financial activities. Although youth are frequent users of these tools, many lack a comprehensive understanding of the financial products they engage with, which poses risks for financial stability and long-term planning. This research highlights the need for a concerted effort to improve digital financial literacy through educational initiatives, public-private partnerships, and increased social media engagement. By equipping young people with the knowledge and skills necessary to navigate digital finance responsibly, society can ensure that youth are empowered to make informed decisions that lead to financial security and well-being.

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## A STUDY ON FINANCIAL SECTOR IN INDIA

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**Abstract:** India's monetary and financial sectors have performed well in the first nine months of FY25. Bank credit has grown at a steady rate in the current financial. The financial sector is currently undergoing a transformative period marked by several emerging trends. Notably, there is an increase in the share of consumer credit in overall credit extended by banks and a rise in non-bank financing options. Additionally, equity-based financing has gained popularity, with the number of initial public offerings (IPOs) increasing sixfold between FY13 and FY24. While these developments herald a new era for the financial sector, they also introduce potential risks from a regulatory standpoint. The rise in consumer debt, the expansion of unsecured lending, and the growing number of young investors underscore the need for balancing growth and stability. Such regulation should encourage financial sector growth while ensuring stability and resilience. Year, with credit growth converging towards deposit growth.

**Keywords:** Financial sectors, economic development, investment, liquidity, financial stability and resilience, banks, insurance companies, risk management, economic growth.

**Introduction:**

India's financial sector is one of the most significant and diverse in the world, reflecting the country's status as one of the largest econo-

mies globally. It encompasses a wide range of services, institutions, and markets, and has evolved over time to meet the demands of a growing economy. Here's an overview of the key components of India's financial sector. Financial institutions play a pivotal role in shaping a country's economic growth trajectory by facilitating savings, investments, and credit for economic activities. The prevailing monetary policies influence the interplay between financial intermediation and economic growth.

### Objectives of the Study:

1. To study regarding Financial Sector in India
2. To know the growing factors of financial sector in India.
3. To Study the Challenges Facing the Financial Sector.

### Research Methodology:

This study adopts a qualitative research methodology secondary data sources. The primary data is gathered through interviews with industry professionals and financial experts to gain insights into the current functioning and challenges faced by financial sectors. Secondary data is sourced from academic journals, books, government publications, and reports by financial organizations. A case study approach is utilized to demonstrate how financial sectors contribute to economic growth in different sectors, followed by a comparative analysis of their roles in developed and developing economies. The research also reviews the existing regulatory frameworks that govern financial institutions and assesses their effectiveness.

### Financial sector in India:

**1. Banking Sector:** The banking sector is the backbone of India's financial system and is regulated by the **Reserve Bank of India (RBI)**. It includes various types of banks, each serving different functions:

- **Public Sector Banks (PSBs):** These are government-owned banks, such as **State Bank of India (SBI)**, **Punjab National Bank (PNB)**, and **Bank of Baroda**. They dominate the sector, of-

fering a wide range of retail and commercial banking services.

- **Private Sector Banks:** These banks are owned by private entities, like **HDFC Bank**, **ICICI Bank**, and **Axis Bank**. They are known for adopting new technologies and often outperform PSBs in customer satisfaction.

- **Foreign Banks:** Many international banks like **Citibank**, **HSBC**, and **Standard Chartered** operate in India, mainly serving corporate clients.

- **Regional Rural Banks (RRBs):** These are specialized banks aimed at rural development and financial inclusion.

- **Cooperative Banks:** These are smaller banks that focus on providing financial services to cooperative societies and rural populations.

### 2. Non-Banking Financial Companies (NBFCs):

**NBFCs** are financial institutions that provide a range of services similar to banks but do not have a banking license. They include:

- **Lending Companies:** They provide loans to individuals, businesses, and sectors like housing, infrastructure, and agriculture.

- **Investment Companies:** These companies engage in activities like asset management and wealth management.

- **Microfinance Institutions:** Focused on offering small loans to the underserved and rural populations.

NBFCs have become a crucial part of India's financial sector, especially in areas where traditional banking services are limited.

**3. Stock Markets and Capital Markets:** India's capital markets are highly developed and are regulated by the **Securities and Exchange Board of India (SEBI)**. Major institutions include:

- **Bombay Stock Exchange (BSE):** One of the oldest stock exchanges in the world, it lists thousands of companies.

- **National Stock Exchange (NSE):** A more recent but equally important exchange, known for its electronic trading platform.

The stock markets provide platforms for companies to raise capital through **Initial Pub-**

lic Offerings (IPOs), and investors can buy and sell shares. **Mutual Funds, Exchange-Traded Funds (ETFs), and Derivative Markets** are also important components of India's capital markets.

**4. Insurance Sector:** India has a rapidly growing **insurance industry**, with both **life and general (non-life)** insurance sectors. The sector is regulated by the **Insurance Regulatory and Development Authority of India (IRDAI)**.

- **Life Insurance:** Companies like **Life Insurance Corporation of India (LIC), HDFC Life, and ICICI Prudential** dominate the market.

- **General Insurance:** This includes health, vehicle, property, and other types of insurance, with key players like **New India Assurance, Bajaj Allianz, and Tata AIG**.

The industry is expected to grow further as awareness about insurance products increases, especially among the middle class.

**5. Pension and Retirement Funds:** The **Pension Fund Regulatory and Development Authority (PFRDA)** regulates pension funds in India. The **National Pension Scheme (NPS)** is one of the primary government-sponsored retirement savings schemes, offering tax benefits to contributors.

**6. Microfinance and Financial Inclusion:** India has made substantial progress in promoting **financial inclusion**, with various government schemes and initiatives aimed at providing financial services to underserved areas.

- The **Pradhan Mantri Jan Dhan Yojana (PMJDY)** aims to provide banking access to every household.

- **Aadhaar-enabled Payment Systems (AePS)** allow people to access banking services using their biometric details, aiding those in remote areas.

**7. Regulatory Framework:** The **Reserve Bank of India (RBI)** plays a central role in regulating and overseeing the banking and financial systems. Other regulatory bodies include:

- **Securities and Exchange Board of India (SEBI)** for capital markets.

- **Insurance Regulatory and Development Authority of India (IRDAI)** for the insurance sector.

- **Pension Fund Regulatory and Development Authority (PFRDA)** for pension funds.

**8. Fintech and Digital Payments:** The **Fintech** industry in India has seen explosive growth, with technological advancements transforming financial services. Innovations like **UPI (Unified Payments Interface)** have revolutionized digital payments, enabling instant transfers between banks. Other key players include **Paytm, PhonePe, and Razorpay**.

**Growth and Development of Financial Sectors:**

**1. Economic Reforms and Liberalization:** India's financial sector growth accelerated after economic liberalization in the early 1990s. The government introduced several reforms to open up the economy, encourage foreign investment, and enhance financial market efficiency.

**Key reforms include:**

- **The establishment of the Securities and Exchange Board of India (SEBI)** in 1992 to regulate the securities market.

- **Privatization of banks** and the introduction of **private sector players** into banking, which fostered competition.

- **Financial Sector Legislative Reforms Commission (FSLRC)**, which led to comprehensive changes in banking and finance regulations.

**2. Growth of Banking and Financial Services:**

- **Commercial Banks:** India has a well-developed banking infrastructure, with a mix of public sector, private sector, and foreign banks. The banking sector plays a pivotal role in the economy, with the Reserve Bank of India (RBI) regulating it.

**Public sector banks** dominate but have faced challenges related to non-performing assets (NPAs) and capital adequacy.

**Private Banks** like HDFC, ICICI, and Axis Bank have grown rapidly in terms of assets, profitability, and customer reach.

**Digital banking** has also seen explosive growth, especially with initiatives like **PMGDISHA**, **Jan Dhan Yojana**, and **Digital India**.

- **Non-Banking Financial Companies (NBFCs):** These have grown rapidly and cater to segments such as personal loans, consumer finance, and vehicle financing. However, the sector faces challenges related to liquidity risk and regulation.

- **Insurance and Pension Funds:** The Indian insurance industry has grown substantially due to increased awareness, rising disposable incomes, and government push. The pension funds and retirement market have also expanded with a growing focus on long-term savings and retirement planning.

**3. Capital Markets:** India's capital markets, including the **stock market** (both the Bombay Stock Exchange and National Stock Exchange), have grown substantially in terms of market capitalization, trading volumes, and global integration.

- **Foreign Direct Investment (FDI):** The financial sector has benefitted from increased FDI, especially in banking, insurance, and mutual funds.

- **Mutual Funds and SIPs:** The growth of retail participation through **Systematic Investment Plans (SIPs)** and mutual funds has made India one of the fastest-growing markets in this sector.

- **Private Equity (PE) and Venture Capital (VC)** investments have surged, particularly in technology startups, fintech, and e-commerce.

#### 4. Technological Advancements:

- **Digital Transformation:** India has embraced **financial technology (fintech)** with platforms like **Paytm**, **PhonePe**, and **Razorpay** revolutionizing payments, lending, and investments. The rise of mobile wallets, UPI (Unified Payments Interface), and digital banking has increased financial inclusion across the country.

- **Fintech Startups:** India is one of the largest fintech hubs in the world, with a rapidly grow-

ing ecosystem of digital payment companies, lending platforms, and insurance startups.

- **Block chain and Crypto currencies:** While still under regulation and scrutiny, India's potential for block chain applications in finance, especially in areas like remittances and trade finance, is gaining attention.

#### 5. Financial Inclusion:

- **Jan Dhan Yojana:** This initiative has brought millions of previously unbanked Indians into the financial system by providing access to basic bank accounts.

- **Microfinance:** Non-profit organizations and microfinance institutions (MFIs) have played a crucial role in providing small loans to individuals in rural and underserved areas.

#### 6. Regulatory and Policy Support:

- **RBI's Monetary Policy:** The RBI's proactive monetary policy management and the adoption of inflation targeting have provided stability to the Indian economy.

- **Pradhan Mantri Awas Yojana (PMAY) and Mudra Yojana** have incentivized affordable housing and microfinance, contributing to sector growth.

- The government's push toward digitization, **Aadhaar**, and **GST** has increased transparency and formalized a significant part of the economy, opening up more opportunities for financial services.

**7. Global Integration:** India's financial markets are increasingly integrated with the global economy, with greater participation from foreign investors and international financial institutions. The growth of global trade, foreign exchange reserves, and Indian multinational companies also plays a vital role in the sector's growth.

#### Key Challenges Facing the Financial Sector:

- **Non-Performing Assets (NPAs):** While NPAs have reduced due to reforms like the **Insolvency and Bankruptcy Code**, they continue to pose a challenge, particularly for public sector banks.

- **Regulatory Challenges:** Despite numerous reforms, regulatory challenges persist, particularly

in areas like cryptocurrency, financial innovation, and consumer protection.

· **Financial Literacy:** Despite growing financial inclusion, a significant portion of the population remains financially illiterate, hindering full participation in the formal financial system.\

#### Findings & Suggestions:

##### Findings:

**1. Economic Growth Support:** Financial sectors facilitate economic development by channeling funds from savers to borrowers, thus enabling businesses to grow and individuals to invest. They are crucial in fostering entrepreneurship and innovation by providing access to capital for new ventures.

**2. Liquidity Provision:** By offering liquid assets, financial sectors help maintain economic stability. They act as intermediaries between surplus and deficit units in the economy, allowing money to flow smoothly between individuals, companies, and governments.

**3. Risk Management:** Financial institutions provide products such as insurance, derivatives, and pension funds, which help manage risks associated with business operations, personal finances, and investments.

**4. Regulatory Compliance and Challenges:** The lack of effective regulation in some regions has led to financial instability, such as the 2008 global financial crisis. Financial sectors often face challenges related to liquidity risks, credit risks, and market volatility.

##### Conclusion:

In conclusion, the financial sector in India is on a strong growth trajectory with significant advancements in technology, regulatory reforms, and financial inclusion initiatives. However, challenges such as NPAs, regulatory uncertainties, and financial literacy need continued attention to ensure sustainable growth. India's financial sector is growing rapidly and diversifying, with numerous opportunities for expansion. The government and regulatory bodies are keen on fostering financial inclusion,

improving access to banking, and making the sector more robust. However, challenges such as bad loans, financial literacy, and ensuring a balance between regulation and innovation remain areas for improvement.

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## The Future of Cyber Defense: AI and Machine Learning in Cybersecurity

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### Abstract

Cyber threats are evolving rapidly, making traditional security measures insufficient in combating sophisticated attacks. Artificial Intelligence (AI) and Machine Learning (ML) are transforming cybersecurity by enabling real-time threat detection, automated response, and predictive analytics. This paper explores the role of AI and ML in cyber defense, analyzing current trends, statistical insights, challenges, and future implications. The study is based on secondary data from research papers, industry reports, and cybersecurity databases. While AI enhances cybersecurity capabilities, it also introduces risks, including adversarial attacks and ethical concerns. The paper concludes with recommendations on leveraging AI while mitigating its vulnerabilities.

**Keywords:** Cybersecurity, Cyber Defense, Artificial Intelligence, Machine Learning, Digital Threats, Cybercrime Prevention, Predictive Analytics

### Introduction

In today's digital era, cybersecurity has become a critical concern for individuals, businesses, and governments worldwide. The increasing dependency on digital platforms has led to a surge in cyber threats, ranging from malware and ransomware attacks to sophisticated AI-driven cybercrimes. Traditional security measures, such as firewalls and antivirus

software, are no longer sufficient to combat rapidly evolving cyber threats. As cybercriminals employ advanced techniques, the need for **intelligent, automated, and predictive cybersecurity solutions** has grown exponentially.

Artificial Intelligence (AI) and Machine Learning (ML) have emerged as game-changers in the field of **cyber defense**. AI-powered cybersecurity systems enhance threat detection, automate responses, and improve predictive analytics, reducing the burden on human analysts. Machine Learning models can analyze vast datasets, identify patterns, and detect anomalies in real time, making cybersecurity more proactive rather than reactive. These technologies enable security teams to respond to cyber threats faster and more accurately, minimizing potential damage.

The integration of AI and ML in cybersecurity is already evident in various industries. Financial institutions use AI to detect fraudulent transactions, while e-commerce platforms leverage ML algorithms to prevent account takeovers. Governments and law enforcement agencies also employ AI-driven security measures to combat cyber terrorism and espionage. However, despite their advantages, AI and ML pose new challenges, such as **adversarial AI attacks, false positives in threat detection, and ethical concerns related to data privacy**. This paper explores the **current role of AI and ML in cybersecurity**, their **advantages and challenges**, and their **future potential in strengthening cyber defense mechanisms**. By analyzing **secondary data sources**, including academic research, industry reports, and cybersecurity statistics, this study aims to provide a comprehensive understanding of AI-driven cybersecurity and its impact on the future of digital security.

### Objectives of the Study

To analyze the concept of cybersecurity and cyber defense.

- To examine the role of AI and ML in modern cybersecurity strategies.
- To assess current trends and statistical insights related to AI-driven cybersecurity.
- To explore the future potential, challenges, and precautions required for AI-based cyber defense.
- To discuss the advantages and disadvantages of AI in cybersecurity.

### Research Methodology

This study is entirely based on **secondary data**, gathered from academic research papers, industry reports, government publications, and credible online sources. Previous theses, scholarly articles were analyzed to understand AI and ML applications in cybersecurity. News reports and statistical data from cybersecurity databases were also reviewed to assess current trends and future implications. This qualitative research follows a descriptive approach to provide insights into AI-driven cyber defense.

### What is Cybersecurity?

Cybersecurity refers to the protection of digital systems, networks, and data from cyber threats such as hacking, malware, phishing, and ransomware attacks. It encompasses various strategies, including encryption, firewalls, intrusion detection, and AI-driven analytics, to secure information assets.

### Cybersecurity, Artificial Intelligence (AI), and Machine Learning (ML) in Cyber Defense

#### Cybersecurity: An Overview

Cybersecurity is the practice of protecting digital systems, networks, and data from unauthorized access, cyberattacks, and data breaches. With the increasing reliance on digital platforms, cyber threats have grown in complexity, targeting individuals, businesses, and government institutions. Organizations face numerous security challenges, including malware infections, phishing attacks, ransomware, and denial-of-service (DoS) incidents. These threats not only compromise sen-

sitive data but also disrupt critical infrastructure, leading to financial and reputational losses. Traditional cybersecurity measures, such as firewalls, encryption, and multi-factor authentication, have been effective to some extent. However, with cybercriminals adopting more advanced tactics, traditional methods alone are no longer sufficient to counter modern threats. This has led to the integration of emerging technologies like Artificial Intelligence (AI) and Machine Learning (ML) into cybersecurity frameworks.

#### Artificial Intelligence (AI) in Cybersecurity

Artificial Intelligence (AI) has transformed cybersecurity by enhancing threat detection, automating responses, and improving overall security efficiency. AI-powered security systems analyze vast amounts of data to identify suspicious activities and potential cyber threats in real time. By using intelligent algorithms, AI can recognize patterns in network behavior, detect anomalies, and predict potential attacks before they happen. Additionally, AI-driven security tools enable automated incident response, reducing the time required to mitigate threats and minimizing human intervention. AI is also widely used in fraud prevention, where it detects abnormal financial transactions and prevents unauthorized access to sensitive information. However, while AI strengthens cyber defenses, it also presents challenges. Cybercriminals have begun exploiting AI to develop adversarial attacks, manipulate security models, and generate sophisticated malware that can bypass traditional security measures. As AI continues to evolve, balancing its advantages with security risks remains a significant concern for cybersecurity professionals.

#### Machine Learning (ML) in Cybersecurity

Machine Learning (ML), a subset of AI, plays a crucial role in modern cybersecurity by enabling systems to learn from data, adapt to new threats, and improve security over time. Unlike rule-based security systems that rely on

predefined instructions, ML algorithms analyze past cyber incidents to identify emerging attack patterns. One of the key applications of ML in cybersecurity is predictive analytics, where it helps forecast potential cyber threats based on historical data. ML is also used in behavioral analysis, allowing security systems to detect deviations in user activity that may indicate a cyberattack. For instance, if an employee suddenly accesses a large volume of confidential data outside of working hours, an ML-based security system can flag this as a potential security breach. Furthermore, ML enhances malware detection by continuously updating its knowledge base to recognize new and evolving threats. Despite its benefits, ML also has limitations, such as the risk of false positives, where legitimate activities may be mistakenly classified as threats. Additionally, adversaries can manipulate ML models by feeding them misleading data, a tactic known as adversarial machine learning. Addressing these challenges is essential to ensure that ML-driven cybersecurity solutions remain reliable and effective.

The integration of AI and ML in cybersecurity marks a significant shift toward intelligent, automated, and proactive security mechanisms. As cyber threats become more advanced, the adoption of AI-driven solutions will continue to grow, making cybersecurity systems more resilient. However, organizations must also be aware of the risks associated with AI and ML and implement safeguards to mitigate potential vulnerabilities. Ensuring transparency, improving model accuracy, and incorporating human oversight in AI-based security frameworks will be crucial for building a secure digital future.

### **Current Applications of AI & ML in Cybersecurity**

The integration of Artificial Intelligence (AI) and Machine Learning (ML) in cybersecurity has revolutionized the way organizations detect, prevent, and respond to cyber threats. These

technologies provide **real-time threat intelligence, automated security responses, predictive analytics, and adaptive learning capabilities** that traditional security methods lack. AI and ML are now widely implemented across various cybersecurity applications, enhancing digital protection for businesses, governments, and individuals.

### **Threat Detection and Anomaly Detection**

AI and ML-powered systems have significantly improved threat detection by identifying suspicious activities in real time. Traditional security systems rely on predefined rules and signature-based detection, which often fail to recognize new or evolving threats. AI-driven security solutions, however, use advanced data analytics and behavioral analysis to detect anomalies in network traffic, identifying threats even before they are officially recognized. Machine Learning algorithms continuously learn from past attacks and adapt to emerging threats, making security systems more effective against **zero-day attacks**—cyberattacks that exploit previously unknown vulnerabilities. AI-based **intrusion detection systems (IDS)** and **intrusion prevention systems (IPS)** analyze vast amounts of network data to spot irregular patterns that may indicate a cyber threat.

### **Automated Incident Response**

One of the most significant advantages of AI in cybersecurity is **automated incident response**. Cyberattacks require swift action to mitigate potential damage, but traditional security teams often struggle with alert fatigue, overwhelmed by the high volume of security alerts. AI-driven security automation helps by analyzing alerts, prioritizing threats, and taking immediate action without human intervention. Security orchestration, automation, and response (SOAR) platforms use AI to **contain malware, isolate compromised systems, and neutralize attacks** before they spread. This reduces response time, minimizes human errors, and enhances overall security efficiency.

## Phishing and Social Engineering Attack Prevention

AI and ML play a crucial role in combating **phishing attacks and social engineering threats**, which remain among the most common forms of cybercrime. Cybercriminals use sophisticated phishing emails and messages to trick individuals into revealing sensitive information, such as login credentials or financial details. AI-powered **email security solutions** analyze email content, sender behavior, and communication patterns to detect phishing attempts. Machine Learning algorithms are trained to recognize fraudulent websites, suspicious email attachments, and fake login pages, providing an added layer of protection against phishing scams.

### Fraud Detection and Identity Protection

Financial institutions and e-commerce platforms extensively use AI and ML to detect **fraudulent activities and identity theft**. Traditional fraud detection systems rely on pre-defined rules, but AI-based solutions analyze transactional patterns and flag suspicious activities in real time. ML models detect anomalies in payment behavior, such as unusual spending patterns, unauthorized transactions, or account takeovers. AI-driven **biometric authentication** systems, including facial recognition and voice analysis, enhance identity verification and prevent unauthorized access to sensitive accounts.

### Malware Detection and Prevention

Machine Learning models have transformed **malware detection** by identifying malicious software based on behavioral patterns rather than signature-based detection methods. Traditional antivirus software depends on existing malware signatures, making it ineffective against new or modified malware. AI-driven security systems, however, analyze **malware characteristics, file behavior, and system interactions** to detect and block previously unseen threats. AI-powered **sandboxing techniques** execute suspicious files in a controlled environ-

ment to observe their behavior, helping to identify and neutralize advanced persistent threats (APTs).

### Predictive Analytics and Cyber Threat Intelligence

AI and ML are instrumental in **predictive analytics**, allowing cybersecurity teams to anticipate and prepare for potential cyberattacks. By analyzing historical attack data, AI-driven threat intelligence platforms can predict where and when cybercriminals are likely to strike next. These systems collect and process vast amounts of cybersecurity data from global networks, identifying **emerging trends, attack vectors, and high-risk vulnerabilities**. Governments and businesses use AI-powered threat intelligence to strengthen their defenses and **implement proactive security measures** before an attack occurs.

### User and Entity Behavior Analytics (UEBA)

User and Entity Behavior Analytics (UEBA) is an AI-driven approach that focuses on detecting insider threats and compromised accounts. ML algorithms analyze **user behavior patterns, login attempts, and data access activity** to identify deviations that may indicate malicious intent. For example, if an employee suddenly accesses a large volume of sensitive data outside of working hours or logs in from an unusual geographic location, the system flags this as a potential security threat. AI-based UEBA solutions help organizations prevent data breaches caused by **insider threats, account takeovers, and credential stuffing attacks**.

### AI-Powered Cybersecurity Assistants and Chatbots

AI-driven cybersecurity assistants and chatbots provide automated support for IT security teams and end-users. These AI-powered virtual assistants help **answer security-related queries, guide users through security protocols, and provide real-time threat alerts**. Businesses implement AI chatbots to educate employees about cybersecurity best practices, re-

ducing human errors that often lead to security breaches. Additionally, AI-driven **cyber threat hunting** solutions proactively scan systems for vulnerabilities, providing security teams with valuable insights.

### The Growing Role of AI in National Cyber Defense

Governments worldwide are investing in **AI-driven national cybersecurity strategies** to protect critical infrastructure from cyber warfare and cyber terrorism. AI helps **monitor national security threats, detect foreign cyber intrusions, and strengthen cyber defense mechanisms**. Military and intelligence agencies use AI-based cyber tools for **threat intelligence, risk assessment, and counter-cyber espionage**. The increasing use of AI in national security has led to **cyber arms races**, where nations develop **AI-powered hacking and counter-hacking techniques**.

### Current Scenario with Statistical Insights

The increasing complexity and volume of cyber threats have driven a significant shift toward AI-powered cybersecurity solutions. Organizations worldwide are recognizing the **superior efficiency and accuracy of AI and Machine Learning (ML) in threat detection, response automation, and predictive analytics**. The AI-driven security market is experiencing rapid expansion, reflecting the growing reliance on these advanced technologies. According to a **MarketsandMarkets (2023) report**, the global AI-powered cybersecurity market, valued at **\$10 billion in 2023**, is projected to reach **\$46 billion by 2028**, demonstrating a **compound annual growth rate (CAGR) of over 35%**. This surge highlights the increasing investment in AI-based defense mechanisms to combat evolving cyber threats.

One of the key advantages of AI in cybersecurity is its **enhanced threat detection capabilities**. AI-powered systems are capable of detecting **92% of cyber threats**, outperforming traditional security methods, which achieve

only **84% detection accuracy** (Capgemini, 2023). This significant improvement is due to AI's ability to analyze vast amounts of real-time data, identify subtle anomalies, and predict potential attack patterns before they materialize. As cybercriminals continue to develop sophisticated attack techniques, AI's predictive analytics play a crucial role in strengthening cyber defense strategies.

Despite the advancements in cybersecurity, cybercrime remains a growing global concern. The financial impact of cyberattacks is staggering, with **global cybercrime costs expected to reach \$10.5 trillion annually by 2025** (Cybersecurity Ventures, 2023). This represents a substantial increase from previous years, emphasizing the urgent need for more robust security measures. Businesses, government agencies, and individuals face mounting risks, including **ransomware attacks, data breaches, and financial fraud**, which have become more frequent and destructive. The growing cost of cybercrime highlights the critical role AI and ML play in **minimizing financial losses, mitigating risks, and improving overall cybersecurity resilience**.

One of the most prevalent cyber threats today is **AI-driven phishing attacks**, which have become more sophisticated and difficult to detect. In 2023, **80% of organizations reported experiencing AI-powered phishing attempts** (IBM X-Force Report, 2023). These attacks leverage **deepfake technology, automated phishing campaigns, and AI-generated fraudulent emails** to deceive employees and extract sensitive information. Traditional email security measures often fail to detect such highly personalized and adaptive phishing attacks, making AI-driven **email threat detection and behavioral analysis crucial** in preventing data breaches and identity theft.

The rapid adoption of AI and ML in cybersecurity is reshaping how organizations defend against digital threats. However,

cybercriminals are also leveraging AI to enhance their attack strategies, leading to an ongoing **AI arms race in cybersecurity**. As both attackers and defenders integrate AI into their operations, organizations must continuously update and refine their security frameworks to stay ahead. The current scenario underscores the **indispensable role of AI-driven security solutions in combating modern cyber threats and ensuring a more resilient digital ecosystem**.

### **The Future of AI & ML in Cybersecurity**

As cyber threats become more sophisticated, the future of AI and Machine Learning (ML) in cybersecurity will focus on enhancing automation, improving detection capabilities, and strengthening digital defenses. AI is expected to evolve into self-learning security systems that can adapt in real time, making them more effective in detecting novel cyber threats. Unlike traditional security models that rely on pre-defined rules, future AI-driven systems will be capable of continuously learning from new attack patterns, making cybersecurity more proactive rather than reactive. These self-learning models will not only detect known threats but also identify anomalies that may indicate emerging cyber risks, allowing organizations to predict and neutralize attacks before they occur.

Another significant development in cybersecurity will be the rise of AI-powered cyber warfare. Governments and organizations worldwide are increasingly leveraging AI for both defensive and offensive cybersecurity strategies. Nations are expected to invest heavily in AI-driven threat intelligence, autonomous cyber defense systems, and AI-enhanced cyber forensics to combat cyber espionage and warfare. However, the growing dependence on AI in military and national security also raises concerns about the potential misuse of AI in cyberattacks, where adversarial AI techniques could be deployed to bypass advanced security systems. As a result, global efforts will be necessary to regulate AI in cybersecurity and establish ethical AI

governance frameworks.

AI and ML will also play a transformative role in identity verification and biometric security. Deep learning models will be extensively used to enhance facial recognition, fingerprint authentication, and voice recognition technologies, reducing the risks of identity theft and unauthorized access. The integration of AI-driven biometric security in financial services, healthcare, and government sectors will provide more reliable and fraud-resistant authentication methods. However, concerns about data privacy, bias in AI-based recognition systems, and potential vulnerabilities in biometric databases will need to be addressed to ensure trust and security in AI-powered identity verification.

As AI continues to shape the future of cybersecurity, there will be an increasing demand for ethical AI practices and transparency in decision-making processes. AI models must be designed to operate without bias and ensure fair and responsible security enforcement. Organizations and policymakers will need to implement guidelines to prevent AI-driven discrimination, ensure accountability in AI decision-making, and protect user privacy. The ethical implications of AI in cybersecurity will become a major focus, emphasizing the need for explainable AI models that provide clear insights into how security decisions are made.

The future of AI and ML in cybersecurity holds immense potential for improving digital security, but it also presents new challenges that must be addressed through continuous innovation, regulation, and ethical AI development. As AI-driven cybersecurity systems become more autonomous and intelligent, organizations will need to adapt to evolving cyber risks while ensuring AI technologies are used responsibly and effectively.

### **Precautions for AI-Driven Cybersecurity**

As AI and Machine Learning (ML) become integral to cybersecurity, it is crucial to implement safeguards to ensure their effective-

ness, security, and ethical use. While AI enhances cyber defense capabilities, it also introduces new risks, such as adversarial manipulation, compliance challenges, and ethical concerns. To mitigate these risks, organizations must adopt **robust precautionary measures** to maintain AI-driven cybersecurity's reliability and security.

One of the primary challenges of AI in cybersecurity is its **vulnerability to adversarial attacks**, where cybercriminals manipulate AI models to evade detection. Attackers can use **adversarial machine learning techniques** to introduce deceptive data into AI systems, causing them to misclassify threats or overlook malicious activities. To counter this, organizations must **develop AI models that are resilient to adversarial inputs** by integrating **robust training ing datasets, anomaly detection techniques, and adversarial testing methods**. Implementing **explainable AI (XAI)** can also help cybersecurity teams understand AI decision-making and detect potential adversarial manipulation.

Another critical precaution is ensuring **regulatory compliance** with global cybersecurity frameworks. AI-driven cybersecurity systems must adhere to **data protection laws and security standards**, such as the **General Data Protection Regulation (GDPR), National Institute of Standards and Technology (NIST) guidelines, and ISO/IEC 27001 cybersecurity standards**. Compliance ensures that AI security models operate within ethical and legal boundaries, protecting user privacy and preventing unauthorized data usage. Organizations must implement **AI governance policies, data encryption protocols, and risk assessment frameworks** to align with regulatory requirements.

While AI automates many cybersecurity functions, it should **support human decision-making rather than replace it**. Human-AI collaboration is essential to ensuring that security

analysts **interpret AI-generated alerts accurately, override false positives, and make informed security decisions**. Relying solely on AI without human oversight can lead to **misjudgments, biased threat assessments, and vulnerabilities in security operations**. Organizations should integrate AI as an **assistive technology**, where human experts validate AI-driven insights, ensuring accuracy and ethical application.

To maintain the efficiency of AI-driven security systems, **continuous model training and updates** are essential. Cyber threats are constantly evolving, and static AI models can become outdated, failing to recognize **new attack patterns, malware variants, and phishing techniques**. Organizations must invest in **ongoing AI model training, real-time threat intelligence feeds, and adaptive learning mechanisms** to keep security models relevant and effective. Implementing **federated learning and decentralized AI approaches** can also enhance cybersecurity by enabling AI models to learn from distributed datasets while preserving privacy.

By addressing **adversarial threats, ensuring regulatory compliance, maintaining human-AI collaboration, and continuously updating AI models**, organizations can strengthen AI-driven cybersecurity and mitigate emerging risks. As AI continues to advance, proactive security measures will be essential to maximizing its benefits while minimizing vulnerabilities in the evolving cyber landscape.

## Conclusion

The integration of Artificial Intelligence (AI) and Machine Learning (ML) in cybersecurity has transformed the way organizations detect, prevent, and respond to cyber threats. AI-driven security systems offer **real-time threat detection, automated response mechanisms, predictive analytics, and adaptive learning capabilities**, making them indispensable in today's evolving cyber landscape. However, as AI enhances cybersecurity defenses, cybercriminals

are also leveraging AI-powered attacks, increasing the complexity of cyber threats.

The **current scenario** highlights the rapid growth of AI-driven cybersecurity solutions, with the market expected to expand significantly in the coming years. AI-powered threat detection outperforms traditional security measures, but organizations must remain cautious about adversarial attacks, compliance challenges, and ethical concerns. Looking ahead, the **future of AI in cybersecurity** will involve self-learning security systems, AI-driven cyber warfare strategies, advanced biometric authentication, and ethical AI development. To ensure effective and secure AI-driven cybersecurity, organizations must implement **robust precautionary measures**, including **adversarial resilience, regulatory compliance, human-AI collaboration, and continuous AI model training**.

Despite its advancements, AI is not a standalone solution; it must be complemented by **human expertise, strong cybersecurity policies, and continuous innovation**. As cyber threats continue to evolve, organizations must adopt **proactive and adaptive AI-driven security frameworks** to protect sensitive data, digital infrastructure, and global cybersecurity ecosystems. By balancing **AI automation with ethical oversight and human intelligence**, AI can be a powerful tool in building a more **secure and resilient digital future**.

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## REGULATORY CHALLENGES AND FUTURE IMPLICATIONS OF SEBI'S NORMS ON FINFLUENCERS

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**ABSTRACT**

In the current digital era, social media has not only taken center stage but has become an integral part of daily life, catalyzed by the ongoing digital revolution that has transformed the media ecosystem. A notable consequence of this evolution is the emergence of financial influencers, colloquially known as finfluencers, on prominent platforms such as YouTube, Instagram, Facebook, and WhatsApp. The author argues that these influencers often dispense investment advice lacking professional experience, operating in an environment devoid of mandatory disclosures and lacking proper registration or licensing. As per a report by Statista, a German firm specializing in market and consumer data, the global market size of influencers has experienced a remarkable surge and figures show a substantial eightfold increase, soaring from a "modest \$1.7 billion in 2016 to nearly \$14 billion in 2021." Also, India had "154 million trading accounts as of April 2024", according to SEBI data, a more than four times jump from the "36 million trading accounts in April 2019."

This paper explores how social media is reshaping financial trust and examines the rise of finfluencers, who demystify financial con-

cepts for a wide audience. However, the absence of mandatory disclosures and SEBI registration raises questions about the accuracy and legality of their advice. This analysis addresses concerns related to transparency, misinformation, and materialism by offering concrete examples and argues for a collaborative effort involving consumers, regulators, brands, agencies, and influencers to effectively address these issues.

**Keywords:** SEBI, Finfluencers, Consultation Paper, Investment Advisor, Retail Investors, SEBI Crackdown.

### INTRODUCTION

The term "Finfluencers" colloquially refers to financial influencers and content creators who, due to their popularity, large number of followers/subscribers, and extensive reach across various social media platforms, wield significant influence over the decisions related to securities for a substantial audience through promotions or recommendations. These influencers produce diverse content covering a wide spectrum of financial information, including investment strategies, personal finance, and analysis of sophisticated financial products, among other topics. Post-pandemic, India has witnessed a surge in social media influencers and influencer marketing, with influencers sharing investment tips despite lacking professional expertise. These influencers are often sponsored by companies to endorse their products. This issue gained prominence in March 2023 when the Securities and Exchange Board of India (SEBI) prohibited an Indian company from exploiting YouTube channels to manipulate stock prices. Certain videos on YouTube disseminated false information, urging viewers to purchase the company's shares for substantial profits. This manipulation resulted in an upswing in the stock's price and trading volume. Those involved in the scheme were subsequently barred from participating in capital markets. The global prevalence of such "pump and dump" schemes has prompted regulatory responses worldwide.

SEBI has responded to the overflow of unsolicited financial guidance on social media by unveiling a consultation paper on August, 2023 and recently by approving these norms in its board meeting in June, 2024. This move aims to transform financial influencers into more reliable sources of information because “encountering unsolicited financial advice has become a regular occurrence for social media users. It exposes people to different levels of influence, leading some to ignore it while others heed the insights shared by these finfluencers and this susceptibility can steer individuals toward misguided financial decisions, posing risks to their financial well-being.”

#### **NEED TO REGULATE FINFLUENCERS**

The financial landscape in India has witnessed a surge in demat account holders, tripling from “4 crore to 11.4 crore between March 2020 and March 2023”. However, the number of Registered Investment Advisors (RIAs) has not seen a proportionate rise, lingering between 1200 and 1400 during the same period. With only one RIA for “every 86,037 demat account holders, totaling 1,325 RIAs serving 114 million demat account holders”, there appears to be a puzzling reluctance among Finfluencers, to register as RIAs with SEBI.

Financial capability does not appear to be a barrier for obtaining SEBI certification. A typical finfluencer, often operating as an individual entity, only needs to acquire an Investment Advisor (IA) or Research Analyst (RA) certification. These certifications have modest financial requirements, with individuals needing net tangible assets ranging from one to five lakh rupees. Compared to this minimal capital requirement, finfluencers often spend significantly larger amounts on digital advertising and marketing, and many publicly claim substantial profits from their market activities. This makes it unlikely that financial constraints are the reason for avoiding SEBI registration.

The reluctance to register may instead

be due to the qualification criteria or obligations placed on registered entities, which could make it difficult or inconvenient for finfluencers to comply with these standards.

#### **The question arises: are Finfluencers even qualified to obtain SEBI certifications?**

For example, Sashwat Verma, a self-proclaimed “genius” trader, runs the Amrevx Academy, where he offers stock market trading courses with perks such as access to his premium Telegram channel. Sashwat claims to earn over 1 crore per month from trading, a success he says began at the age of 19. However, his online profiles and press coverage notably lack any mention of formal qualifications, raising questions about the credibility of finfluencers like him who may seek SEBI certification. The gap between his claimed financial success and the absence of transparent qualifications highlights concerns about the eligibility and reliability of finfluencers in meeting SEBI’s standards for certification.

SEBI imposes strict obligations on certified IAs and RAs to protect investors and ensure fair market practices. A key requirement is that IAs and RAs must act in the best interest of their clients and disclose any conflicts of interest as they arise. For example, an IA is prohibited from receiving payments from anyone other than the client they are advising. This rule conflicts with the typical practices of finfluencers, who often earn significant income from endorsements and affiliate marketing. Finfluencers usually build large follower communities to promote products, services, or ideas, influencing a susceptible audience. For instance, “Dr. Devendra urges followers to trade through specific platforms to gain access to his premium Telegram channel, earning referral fees in the process.” Similarly, Subhadip Nandy sells trading software, and Rohit Srivastava plans to launch algo trading software. A finfluencer Akshat Shrivastava promotes a zero-brokerage stock trading platform, earning referral fees.

Becoming certified as an IA or RA would limit influencers' activities, as Rule 22A (1) of the IA Guidelines prohibits charging clients for products like trading platforms or software. Additionally, certification requires influencers to disclose their securities transactions to SEBI, ensure their trades are consistent with the advice they provide, and tailor their recommendations to each client's specific risk profile. The SEBI (Investment Advisors) Regulations, 2013 (**IA Regulations**) and the SEBI (Research Analysts) Regulations, 2014 (**RA Regulations**) state that individuals must obtain registration certificates from SEBI to serve as an IA or RA, respectively. Regulation 7 of the IA Regulations outlines precise academic qualifications i.e. of a "graduate degree in finance, economics, or business administration or a professional qualification such as a CA, CFA, or MBA. They must also pass a certification examination conducted by National Institute of Securities Markets or any other SEBI-recognized organisation, and a minimum of five years' experience in financial product advice, securities, or fund/asset/portfolio management to qualify for IA certification."

As per Rule 7 of the RA Regulations 2014 the necessary educational and professional qualifications for registration as a research analyst is a postgraduate degree in "finance, accountancy, business management, commerce, economics, capital market, banking, insurance or a post graduate program in the Securities Market (Research Analysis) from National Institute of Securities Markets of a duration not less than one year or a graduate in any discipline with an experience of at least five years in activities relating to advice in financial products or securities or fund or asset or portfolio management and a NISM Certificate".

#### **SEBI CONSULTATION PAPER AND ANALYSIS**

The Consultation Paper outlines guidelines for SEBI registered-intermediaries/entities, emphasizing the need for responsible practices and ethical conduct in their interactions with un-

registered entities, including influencers. The key provisions include: registered intermediaries/entities are mandated to restrict their association, whether directly or indirectly through agents or representatives, with unregistered entities (including influencers). This applies to any form of collaboration involving monetary consideration or otherwise, specifically for the promotion or advertisement of their products or services through unregistered entities. There is a strict prohibition against sharing any confidential information pertaining to clients with unregistered entities and it is implemented to safeguard the privacy and sensitive data of clients. Registered entities are prohibited from receiving trailing commissions based on the number of referrals, commonly referred to as a referral fee. Limited exceptions allow for referrals from retail clients, and fees associated with such referrals are permissible. To maintain integrity and credibility, registered entities must proactively take measures to dissociate themselves from unregistered entities. This includes refraining from any association that could be construed as an endorsement, and actively disassociating their name, service, or product from unregistered entities.

#### **CHALLENGES CONCERNING REGULATION OF FINFLUENCERS**

A crucial question regarding the implementation of the proposed regulations is that addressing content from unregistered influencers might be inconsistent when we take the practical outlook of existing rules. Today, influencers offer investment advice across platforms like Instagram, Facebook, and YouTube and content removal on the internet falls under the purview of the "Information Technology Act, 2000, along with the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021, and the Information Technology (Procedure and Safeguards for Blocking of Access of Information by the Public) Rules, 2009." The procedures involved in content re-

removal are complex and time-consuming, hence blocking non-compliant content through these means might be impractical and could counter the effective enforcement of the proposed regulations. The delay in completing necessary procedures and formalities may cause irreversible harm concerning the influence on retail investors by that time.

Another crucial consideration for the securities regulator is how the proposed regulations will apply to non-resident unregistered finfluencers who offer advice to Indian residents. The Supreme Court, in “Securities and Exchange Board of India v. Pan Asia Advisors Ltd.”, expanded SEBI’s jurisdiction to include individuals outside India whose actions affect the legitimate interests of the country, even if they are not physically present here. This raises questions about how these regulations could be enforced on influencers in jurisdictions like say the United States and Hong Kong which again have many Indian followers.

## CONCLUSION

The burgeoning influence of social media in shaping financial behaviors and decisions has brought the role of financial influencers, or finfluencers, under scrutiny. As the paper comprehensively illustrates, the ascent of finfluencers signifies a transformative era in financial literacy and advisory, offering accessible insights to a diverse audience. However, this democratization of financial advice comes with inherent risks, particularly due to the lack of regulation, transparency, and professional accountability.

The paper also highlights the challenges of enforcing SEBI’s regulations, particularly in the context of cross-border influencers and the complexities of digital content removal. The practical limitations of existing laws, coupled with the dynamic and global nature of social media, demand a more robust and adaptive regulatory approach. Collaboration with international regulatory bodies and leveraging tech-

nology for monitoring and enforcement could enhance the efficacy of SEBI’s efforts.

To address the loopholes in the current system, the paper proposes several actionable measures. Mandatory disclosures of affiliations, stringent penalties for violations, and targeted awareness campaigns can empower investors to make informed decisions. Differentiating between educational content and explicit financial advice is crucial to ensure that regulations do not stifle genuine efforts to enhance financial literacy. Additionally, updating the definition of “investment advisor” to encompass implicit suggestions could close existing regulatory gaps and align SEBI’s framework with global standards.

The enforcement of these measures must be complemented by proactive efforts to raise public awareness about the risks of unregulated financial advice. SEBI’s campaigns to promote registered entities and educate investors about the importance of compliance can play a pivotal role in mitigating the influence of unregistered finfluencers. Furthermore, fostering collaborations between regulators, platforms, and influencers can create a culture of ethical practices and shared accountability.

In conclusion, the undeniable influence of social media and influencers on decision-making processes necessitates a careful examination of their role in the financial landscape. While finfluencers can contribute positively to enhancing financial literacy, concerns about investor protection and financial stability loom large. SEBI’s regulations on financial influencers stems from the belief that financial advice should primarily come from “qualified” individuals and to prevent fraudulent advice and scams as some finfluencers have even partnered with brokers and mutual funds to attract more customers, often engaging in unethical or illegal practices.

The norms introduced by SEBI is a commendable step in addressing recent trends

where influencers misuse their influence for personal gains under the guise of investor education.

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## Empowering Rural India through Digital Innovation: Prospects and Obstacles

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### Abstract:

Digital innovation is transforming rural India by creating new opportunities for economic growth and social progress in areas such as financial inclusion, e-governance, agriculture, healthcare, and education. This study examines how digital innovation can help address long-standing challenges in rural communities while also analyzing the obstacles that hinder its full potential. Key challenges identified include limited digital literacy, inadequate infrastructure, general constraints, and resistance to change, all of which impact the widespread adoption of digital solutions. The study concludes with practical policy recommendations, highlighting the role of advanced technologies like 5G, artificial intelligence, and public-private partnerships in overcoming these barriers. By addressing these challenges, digital innovation can unlock rural India's potential, fostering inclusive, sustainable, and self-reliant communities.

**Keywords:** Digital Literacy, Financial Inclusion, e-Governance, Sustainable Development, Rural India.

### Introduction:

Digital change has appeared as a vital substance for social and economic growth across the world, and its impact is increasingly being felt in rural India. With nearly 65% of India's population living in rural regions, enhancing

digital access and adopting digital literacy in these areas holds enormous potential to link socio-economic gaps, improve governance and raise the overall quality of life. Recent governmental innovations, such as the Digital India program, the expansion of BharatNet, and financial inclusion efforts, have laid the groundwork for digital integration. These initiatives aim to connect rural communities to the internet, enable online banking, e-governance, and telemedicine, e-learning and create digitally skilled employees. However, while these advancements create significant opportunities, the path to achieving comprehensive digital transformation in rural India is troubled with challenges. Issues such as limited digital literacy, insufficient infrastructure, and affordability restrictions, social and cultural opposition often affect the adoption and limit the potential benefits of digital innovation.

This study explores both the prospects and challenges of the digital revolution in rural India. It examines various initiatives, including mobile banking for financial inclusion, e-governance tools for public services, eNAM for agriculture, telemedicine in healthcare, and digital education platforms, to showcase how digital solutions can promote inclusive growth. Additionally, it critically evaluates the barriers that hinder the widespread adoption and effectiveness of these technologies. The study provides practical policy recommendations, highlighting the importance of emerging technologies like 5G, artificial intelligence, and public-private partnerships in overcoming these challenges. By addressing these issues, digital innovation can help unlock rural India's full potential, creating resilient, sustainable, and self-reliant communities for the future..

### Objectives of the Study:

To analyze the impact of digital transformation on key sectors in rural India.

To identify and assess the major challenges in adopting and effectively utilizing digi-

tal technologies.

To propose practical policy recommendations and strategies for improvement.

### Research Methodology:

This study adopts analytical methods to collect data. It is based on a thorough analysis of government reports, policy documents, and academic literature on digital transformation in rural India.

This study employs a mixed-method approach to thoroughly examine how digital initiatives improve productivity and accessibility in key rural sectors, including banking, e-governance, agriculture, healthcare, and education in India. It closely analyzes specific programs such as Jan Dhan Yojana (banking), DigiLocker (e-governance), eNAM (agriculture), eSanjeevani (healthcare), and digital education platforms based on routine observations. Additionally, existing policies were assessed, and recommendations were developed, highlighting the importance of emerging technologies like 5G, IoT, and public-private partnerships in driving digital transformation.

### Review of literature:

1. "Digital Financial Inclusion in Rural India: Opportunities and Challenges" by Meera Sharma explores the role of digital banking and mobile financial services in promoting financial inclusion in rural areas. The study highlights initiatives like Jan Dhan Yojana and the Unified Payments Interface (UPI), which have enabled rural populations to access banking services and participate in the digital economy.
2. "E-Governance in Rural India: Bridging the Gap through Digital Platforms" by Ramesh Kumar and Priya Singh examines the impact of e-governance tools on public service delivery in rural areas. The study evaluates platforms like DigiLocker and online grievance redressal systems, which have streamlined access to government services and improved transparency.
3. "Digital India: Technology to Transform a Connected Nation" by Arvind Gupta and Pankaj

Kumar examines the Digital India initiative, analysing how government programs like Common Service Centres (CSCs) are advancing connectivity and digital literacy in rural areas. The book highlights the importance of infrastructure and training in ensuring the success of digital initiatives, providing a foundational understanding of rural transformation efforts.

4. "Digital Agriculture in India: Pathways for Transforming Smallholder Agriculture" by Anshuman Das focuses on the role of digital tools such as crop monitoring, precision agriculture, and digital marketplaces in empowering smallholder farmers. The study emphasizes the need for digital literacy programs and subsidies to enable farmers to fully benefit from these technologies.

5. "Digital Health in Rural India: An Evaluation of Telemedicine Models" evaluates the effectiveness of telemedicine platforms like eSanjeevani and mobile health services in bridging rural healthcare gaps.

6. "The Future of Digital Transformation in India: Impact of 5G and IoT in Rural Areas" speculates on how advanced technologies like 5G and the Internet of Things (IoT) could transform rural development in sectors such as agriculture, healthcare, and infrastructure. The article underscores the importance of substantial investments in infrastructure and skill development to unlock the transformative potential of these technologies.

This review explores digital initiatives in rural India, covering banking, e-governance, agriculture, healthcare, and education. It highlights opportunities such as financial inclusion and telemedicine while also addressing challenges like digital literacy and infrastructure gaps.

### Digital Transformation in various sectors:

Digital initiatives have transformed rural India by improving productivity, accessibility, and efficiency in key sectors. The sectors involved include:

### 1. e-Banking

Platforms like Jan Dhan Yojana and the Unified Payments Interface (UPI) have expanded financial inclusion in rural areas. Mobile banking services provide access to loans, savings accounts, and insurance products, enabling rural communities to engage in the digital economy and improve their financial security.

### 2. e-Governance

Platforms like DigiLocker and online grievance redressal systems have modernized access to government services, enhancing transparency and efficiency. Initiatives such as Common Service Centres (CSCs) offer rural communities essential services like Aadhaar enrollment, bill payments, and certificate distribution, minimizing the need for physical visits to government offices and making public services more accessible.

### 3. Agriculture

Digital tools like satellite-based soil monitoring, sensors, and drones enable accurate farming, improving water use and crop health. Platforms such as KisanSuidha provide real-time weather forecasts, pest control advice, and fertilizer recommendations, boosting crops and reducing costs. The eNAM (Electronic National Agriculture Market) platform empowers farmers by offering national market prices and connecting them directly with buyers, reducing dependence on middlemen. Digital financial solutions, including micro-loans and crop insurance through platforms like PM-KISAN, ensure timely financial support.

### 4. Healthcare

Telemedicine platforms like eSanjeevani provide remote consultations, helping to overcome the shortage of healthcare facilities in rural areas. Mobile health apps like Aarogya Setu and the Ayushman Bharat Digital Mission assist community health workers in tracking vaccinations, maternal care, and chronic diseases, enhancing preventive healthcare. Additionally, digital pharmacies ensure that rural residents

have easy access to essential medicines.

### 5. Education

Digital platforms like Diksha and PM eVIDYA offer high-quality learning resources, including video lessons and interactive materials, helping to bridge the urban-rural education gap. Remote classrooms enable real-time learning, even in areas facing teacher shortages. Skill development programs like Skill India provide vocational training linked to local job opportunities, enhancing employability for rural youth. Additionally, teacher training resources improve teaching quality, leading to better educational outcomes.

### Challenges in Digital Transformation in Rural India

#### 1. E-Banking:

Limited digital literacy and trust in digital financial systems.

Poor internet connectivity and lack of smartphones in remote areas.

Cybersecurity concerns and fraud risks.

#### 2. E-Governance:

Inadequate infrastructure for continuous digital service delivery.

Lack of awareness and limited adoption of e-governance tools among the rural population

Administrative inefficiencies and delays in implementation.

#### 3. Agriculture:

The high cost of digital tools and technologies poses a challenge for smallholder farmers.

Limited access to reliable internet and electricity in rural areas.

Resistance to adopting new technologies due to deep-rooted traditional practices.

#### 4. Healthcare:

Lack of trained healthcare professionals to operate digital tools.

Poor internet connectivity disrupting telemedicine services.

Limited awareness and trust in digital

health solutions.

### 5. Education:

Inadequate digital infrastructure in educational institutions.

Lack of teacher training for effective use of digital tools.

Limited access to affordable devices and internet for students.

Overcoming these challenges requires targeted policies, infrastructure development, and capacity-building initiatives.

### Findings:

Digital initiatives have played a crucial role in improving access and efficiency in key rural sectors, including agriculture, healthcare, education, e-banking, and e-governance. Government programs such as eNAM for agricultural marketing, eSanjeevani for telemedicine, PM eVIDYA for digital education, Jan Dhan Yojana for financial inclusion, and DigiLocker for secure document storage have helped bridge the gap between rural and urban areas. These initiatives have provided rural communities with better opportunities to access markets, quality healthcare, education, financial services, and government resources. By reducing physical and financial barriers, digital transformation is empowering rural populations and driving sustainable development.

Government initiatives like Digital India have created a strong foundation, but more localized policies are needed to meet sector-specific demands, such as affordable healthcare technology, agricultural tools, and educational resources. Emerging technologies like 5G, IoT, and AI offer great potential for precision agriculture, advanced telemedicine, and interactive education. However, their success relies on significant investments in infrastructure and skill development.

In e-banking, platforms like UPI have greatly improved financial inclusion by making digital transactions more accessible. However, challenges such as cybersecurity risks and a lack of trust in digital systems still hinder widespread adoption. Similarly, e-governance tools have simplified public service delivery, but issues like poor internet connectivity and bureaucratic inefficiencies continue to create obstacles in their

effective implementation. Addressing these challenges is essential to fully realizing the benefits of digital transformation in rural areas.

To fully harness the benefits of digital transformation, it is crucial to bridge infrastructure gaps and overcome digital literacy challenges. Strengthening connectivity, improving access to digital tools, and providing proper training will help ensure inclusive and sustainable development in rural areas.

### Suggestions:

**1. Strengthen Digital Infrastructure:** Investing in reliable internet, affordable digital devices, and a steady power supply is essential to ensure smooth access to digital services in remote areas.

**2. Promote Digital Literacy:** Implement targeted campaigns to enhance digital literacy, particularly for women, older adults, and marginalized communities, empowering them to use digital platforms effectively.

**3. Localized Policy Interventions:** Create sector-specific policies to tackle unique rural challenges, including subsidies for agricultural tools, affordable healthcare technologies, and accessible educational resources.

**4. Expand E-Banking Services:** Enhance financial inclusion by promoting awareness of e-banking platforms, addressing cybersecurity concerns, and building trust in digital financial systems through community engagement.

**5. Improve E-Governance Accessibility:** Make e-governance platforms more user-friendly, run awareness campaigns, and streamline administrative processes to encourage wider adoption and improve service delivery.

**6. Control Emerging Technologies:** Invest in 5G, IoT, and AI to enable precision agriculture, advanced telemedicine, and interactive education, while providing training to build local expertise.

**7. Address Affordability:** Offer subsidies or affordable financing options for digital devices and services to ensure accessibility for low-income rural communities.

By focusing on these key areas, India can fully leverage digital transformation to promote inclusive and sustainable development in rural communities.

### Conclusions:

Digital transformation can drive the development of rural India by improving efficiency, accessibility, and inclusivity in key sectors such as agriculture, healthcare, education, e-banking, and e-governance. Initiatives like eNAM, eSanjeevani, and Jan Dhan Yojana have contributed significantly, but challenges remain, including inadequate infrastructure, low digital literacy, and accessibility issues. Overcoming these barriers requires targeted policies, investments in emerging technologies, and public-private partnerships. Strengthening digital infrastructure, promoting digital literacy, and leveraging innovations like 5G and AI can help bridge the urban-rural gap and support sustainable development. A collaborative and inclusive approach will ensure that digital transformation benefits reach every part of the country, empowering rural communities for a better future.

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## THE SOLID WASTE MANAGEMENT THROUGH SOCIAL DIMENSIONS TOWARDS SOCIAL DEVELOPMENT IN INDIA

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#### Abstract

The objectives of writing of this paper are to study the current practices related to the various waste management initiatives taken in India from social point of view. "The other purpose is to provide some suggestions and recommendations to improve the waste management practices in Indian town's villages and cities. This research article is based on secondary data research. Existing reports related to waste management and recommendations of planners/ NGOs/ consultants/government accountability agencies/ key industry experts/ for improving the system are studied. It offers deep knowledge about the various waste management initiatives taken by government of India for social development as well as social dimension point of view is concern and also" (Das, 2020) find out the scope for improvement in the management of waste for the welfare of the society. This research paper attempts to understand the important role played by the formal sector engaged in waste management in our country.

**Key words:** - Solid, Waste, Social, Management,

Environment, Society, Industrial, India, State.

## INTRODUCTION

Today, one of the critical issues accompanying global economic and social development is the significant increase of the amount of waste generated. "According to the Global Waste Management Outlook (UNEP, 2015), the global annual increasing rate of solid waste is about 2 billion tons. Besides the explosive growth in the weight and volume, the composition of the MSW is becoming more and more complex" (Kamble, Tarapurkar, & Kamble, 2022). It has been widely recognized that these two trends (both increased generation and composition complexity) in MSW have induced severe degradation of air quality, water quality, and public health, and also have contributed to climate change (for example, the release of methane gas). Effective and efficient Solid waste management is, thus, one of the most important and challenging issues throughout the world.

Currently, Solid Waste management" (Choudhary, 2019) is undergoing an evolution from mere disposal, such as landfills, to sustainable management, such as "3R (reuse, recycle, reduce) In Europe, the concept of waste hierarchy was proposed, which consists of five steps: prevention, reuse and preparation for reuse, recycle, recovery, and disposal (Waste Framework Directive, 2008). The goal is to achieve waste minimization by source-reduction, waste diversion, and "non-diverted wastes" disposal through incineration and land filling. This new trend pushes MSW management beyond the scope of technology and requires the involvement of all stakeholders, including product" (Banerjee, Hazra, Ghosh, Ganguly, Naresh, & Chatterjee, 2019) manufacturers, government institutions, private businesses, and householders. Thus, the success of an solid waste management system not only depends on technical innovation, but is also significantly influenced by social, economic, and psychologi-

cal factors, such as public participation, policy, and public attitude and behaviour. Hence, it is important for researchers to understand, design, and evaluate solid waste management from a social dimensions point of view.

## REVIEW OF RESEARCH STUDIES

Abelson (1966) explains in the article 'Waste Management and Control Science,' New Series that the problem of waste management cannot be solved by pouring money on research and development. The study broadly emphasizes both the technical and political aspects, and mentions that the problem of waste management is numerous and serious in some regions than others. New public policies and institutional arrangements are needed before the technologies are adapted. Most of the problems should be dealt with at the local and regional level. The federal/state governments must also take more initiatives to stimulate research and development of new instrumentation. It must encourage proper data collection and evaluation. If the public demands action, then the waste management problem would be resolved. Mc David (1985) in The Canadian Experience with Privatizing Residential Solid Waste Collection Service discovered salary differences between public and private producers. These differences, however, were responsible for efficiency. Two other factors also contributed to the observed efficiency differences. Private firms tended to use larger capacity vehicles-a higher proportion and public operated with smaller average crew sizes. The municipalities tended to give for private contracts mainly for the efficiency point.

Susila, Anand, Elwin and Sujatha (2018) have noted that the application of technology involves less time and less fuel consumption because the trucks visit only selected bins, which have sent messages to the driver. Enabling of technology reduces manual effort and the hectic process of cleaning by minimal usage of vehicles. This directly benefits the administrative

authorities for reducing the financial burden of fuel cost and manpower. Through this, the cleanliness and hygiene of the city is maintained.

Suba et al. (2019) have proposed real-time monitoring of the garbage level of garbage bins and detection of level of the trash reaching the threshold value level by the application of a combination of sensors and Raspberry pi. This application would assist to intimate the workers about the filling of trash in the bins and help to detect plastic bottles, if found in the dustbins. The biodegradable and non biodegradable wastes would be segregated through image processing technique. The smart bin application would help to reduce manpower and others. Ultrasonic sensors are to be used to identify the status of smart bins, and on regular intervals, database updating to be done. DS18B20 is the temperature sensor used, and the pic cam captures mixing of bottles and other plastics in the garbage.

Jain (2007) says that urbanization directly contributes to waste generation, and unscientific waste handling causes health hazards and urban environment degradation. Municipal Solid Waste (MSW) is defined to include refuse from households, nonhazardous solid waste discarded by the industrial, commercial and institutional establishments, market waste, yard waste, and street sweepings, which are collected by the municipal authorities for disposal.

#### RESEARCH GAP

The foregoing review of some of the research studies reveals that, yes there are some research studies relating to the present topic of the research, i.e. Solid waste Management. But all research studies reviewed above are concerning the identification to the relative phenomenon of the Solid and liquid waste testing and separation as well as taking into account its various aspects and parameters. All these research studies are especially in the subject Environmental science. We did not find a single study in Sociology in general and social point of

view in particular. There is an urgent need to study Solid waste Management and their Social dimension is more important. Solid Waste Management through Social Dimensions towards Social Development is a very important, broader and comprehensive missing area in the above review of research literature; hence it is taken up in the present research study. Solid Waste is very serious environmental issue because of pollution to be borne by the society as a whole.

#### OBJECTIVES OF RESEARCH STUDY

1. To study the various sources of solid waste generation.
2. To study the state wise share of Solid Waste Generation in India
3. To understand the social dimensions of solid waste management

#### RESEARCH METHODOLOGY

To better understand the state of research on the social dimensions of solid waste management, the published literature in related areas were characterized and critically evaluated, which further results in an informative reference list. This approach consists of two main steps: reviewing documents, and selecting the critically appraised, relevant research. Although a systematic literature review has been widely used in health science its potential as well.

#### RESULTS AND DISCUSSIONS

##### Various social Sources of Solid Waste:

"Every day, tons of solid wastes are disposed of at various landfill sites. This waste comes from various social backgrounds such as households, offices, industries and agricultural activities, among other sources. If the waste is not properly stored and treated, these landfill sites generate foul odors. It can pollute the surrounding air and seriously affected on the health of humans, wildlife and our environment" (Minko, Vanya, & Blagoeva, 2023)

##### 1. Residential

Residences and homes where people live are some of the major sources of solid waste. The garbage from these places includes food

waste, plastics, paper, glass, leather, cardboard, metals, yard waste, ashes, and special wastes like bulky household items such as electronics, tires, batteries, old mattresses, and used oil. Most homes have garbage bins to hold their solid wastes before the bin is emptied by a garbage collecting firm or person for treatment. It means the social activities of human being are daily create waste which is totality responsible for environmental degradation

## 2. Industrial

one of important social thing is Industries development are among the biggest contributors to solid waste generation, the notable examples being the light and heavy manufacturing industries, construction sites, fabrication plants, canning plants, power plants, and chemical plants. These industries produce a wide range of solid waste, including housekeeping waste, food waste, packaging waste, ashes, construction and demolition materials, special wastes, medical wastes, and other hazardous wastes.

## 3. Commercial

Commercial facilities and also the buildings are yet another source of solid waste today. Commercial buildings and facilities, in this case, refer to hotels, markets, restaurants, godowns, stores, and office buildings. Some of the solid wastes generated from these places include plastics, food wastes, metals, paper, glass, wood, cardboard materials, special wastes, and other hazardous wastes. Those are some of the human being issue are totality responsible for generation of solid waste in huge amount.

## Institutional

Institutional centres like schools, colleges, prisons, military barracks, and other government centres also produce solid waste. Glass, rubber waste, plastics, food waste, wood, paper, metals, cardboard materials, and electronics are only a few examples of waste they generate.

## 4. Construction and Demolition Areas

Construction and demolition sites, whether new construction sites or buildings, roads, road repair sites, or building renovation sites, can also contribute to the solid waste problem. Waste from these sources can come in various forms: steel materials, concrete, wood, plastics, rubber, copper wires, dirt, and glass.

## 5. Municipal Services

The growth and development of human society is responsible for urbanization and the urban centres also contribute immensely to the solid waste crisis in most countries today. Some of the solid waste from municipal services includes street cleaning, wastes from parks and beaches, wastewater treatment plants, landscaping wastes, and wastes from recreational areas, including sludge. Those things are heavily contributed to environmental degradations

## 6. Treatment Plants and Sites

When social development is started then the various technological development will also started and the effect of those activities the heavy and light manufacturing plants, including refineries, power plants, processing plants, mineral extraction plants, and chemical plants, will develop so it will also produce solid waste. Among the wastes produced by these plants are industrial process wastes, unwanted specification products, plastics, and metal parts, just to mention a few.

## 7. Agriculture

The agriculture sector is very essential sector for human civilization and it is very important for human societal growth and social development of human being as will. But it is also responsible for creation of solid and liquid waste. The agricultural waste are like Crop farms, orchards, dairies, vineyards, and feedlots are also sources of solid waste. You can expect these sources to generate waste in the form of agricultural waste, spoiled food, pesticide containers, and other hazardous materials.

## 8. Biomedical

Environmental degradation will create

some negative externalities just like health hazards or some health cost this cost is nothing but social cost which borne on society by their negativity or environmental degradation as well. Some of biological thing are also responsible for that cost it refers to hospitals and biomedical equipment, and chemical manufacturing firms. In hospitals, there are different types of solid wastes produced. Syringes, bandages, used gloves, drugs, paper, plastics, food waste, and chemicals are some common examples. All these require proper disposal to keep them from causing a huge problem for the environment and the people in these facilities.



### Current scenario of solid waste management of India

India is set to undergo rapid urbanization in the coming decade. One major challenge accompanying the urbanization is responsible for rapid rise in solid waste generation because urbanization the social and community level of human solid waste is generated and because of that resign solid waste Management Processes and Systems in India will need to be upgraded to meet this challenge.

"According to the Central Pollution Control Board (CPCB) the total quantity of Solid waste generated in the country is 160,000 metric tonnes per day (TPD). 153,000 TPD of waste is collected at a collection efficiency of 96%. 80,000 TPD (50 %) of waste is treated and

30,000 (18.4%) TPD is landfilled. 50,000 TPD (31.2 %) of the total waste generated remains un-accounted. Per-capita Solid Waste Generation has increased marginally from 118.7 gm/day in 2015-16 to 119.1 gm/day in 2020-21. The maximum quantity of per capita solid waste is generated in Delhi. Processing of solid waste has improved significantly from 19% in 2015-16 to 50% in 2020-21. In the corresponding period, proportion of solid waste landfilled has fallen from 54% to 18.4%. 100% of solid waste is treated in Chhattisgarh, followed by 89% in Daman & Diu and Dadra & Nagar Haveli (DDDNH) and 87% in Goa. According to a World Bank Report, globally 2.01 billion tonnes of municipal solid waste is generated annually, of which at least 33% is not managed in an environmentally safe manner. Global per capita waste generation is 740 gm/day (average) but varies from 110 gm/day to 4.54 kg/day across countries. High Income countries" (Guman, Ekaterina, & Kozlova, 2020) contribute 34% to global waste generation despite having only 16% of the population.

### Major challenges of Solid Waste Management in India

**Rising Waste Generation:** Socio-Economic growth leads to increase in waste generation consequent to rise in consumption. Expansion of digital economy will lead to multifold increase in e-waste generation. In addition, rapidly expanding population will add to waste. A Planning Commission Report (2014) had estimated that India will generate 165 million tonnes by 2030 (60 million tonnes annual in 2020).

**Improper Waste Management:** (a) Poor Processing: Only 50% of the waste is processed. 30% is not accounted and 20% ends up in landfills which is very poor method of disposal (b) Incorrect and Inadequate Segregation Techniques: There is poor segregation at source, Hazardous waste is not sealed and labelled which leads to their improper disposal. In addition,

tion e-waste is not disposed properly; (c) Re-use/recycling of waste occurs through scavengers in the informal sector and there is no Government collection of recyclables; (d) Often garbage is not placed in designated containers, leading to dirty streets.

**Table No. 1. The statistical details of state wise share of Solid Waste Generation in India**

| Sr. No | Name of the State      | Solid Waste (MT/day) | Per Capita Generation (kg/day) |
|--------|------------------------|----------------------|--------------------------------|
| 1      | Maharashtra            | 22164                | 0.46                           |
| 2      | West Bengal            | 15579                | 0.56                           |
| 3      | Uttar Pradesh          | 12751                | 0.47                           |
| 4      | Tamil Nadu             | 11718                | 0.60                           |
| 5      | Andhra Pradesh         | 10868                | 0.56                           |
| 6      | Karnataka              | 7810                 | 0.49                           |
| 7      | Gujarat                | 6800                 | 0.40                           |
| 8      | Rajasthan              | 4966                 | 0.52                           |
| 9      | Bihar                  | 2623                 | 0.41                           |
| 10     | Madhya Pradesh         | 4983                 | 0.40                           |
| 11     | Kerala                 | 2528                 | 0.51                           |
| 12     | Jharkhand              | 1843                 | 0.37                           |
| 13     | Haryana                | 2621                 | 0.46                           |
| 14     | Punjab                 | 1872                 | 0.49                           |
| 15     | Jammu and Kashmir      | 1247                 | 0.59                           |
| 16     | Chhattisgarh           | 1612                 | 0.48                           |
| 17     | Assam                  | 463                  | 0.28                           |
| 18     | Orissa                 | 1238                 | 0.40                           |
| 19     | Meghalaya              | 137                  | 0.39                           |
| 20     | Manipur                | 72                   | 0.22                           |
| 21     | Mizoram                | 86                   | 0.29                           |
| 22     | Goa                    | 81                   | 0.62                           |
| 23     | Nagaland               | 65                   | 0.28                           |
| 24     | Arunachal Pradesh      | 18                   | 0.39                           |
| 25     | Sikkim                 | 19                   | 0.49                           |
| 26     | Himachal Pradesh       | 59                   | 0.31                           |
| 27     | Uttarakhand            | 461                  | 0.38                           |
| 28     | Tripura                | 114                  | 0.46                           |
| 29     | Delhi                  | 11040                | 0.65                           |
| 30     | Puducheri              | 449                  | 0.67                           |
| 31     | Chandigarh             | 486                  | 0.46                           |
| 32     | Andaman and Nicobar    | 114                  | 0.87                           |
| 33     | Daman and Diu          | 23                   | 0.49                           |
| 34     | Lakshadweep            | 05                   | 0.37                           |
| 35     | Dadra and Nagar Haveli | 11                   | 0.38                           |
| Total  |                        | 126926               | 0.46 (Avg.)                    |

**Source: - Annual Report on Solid Waste Management (2020-21), CPCB, Delhi.**

The above table no.1 depicted that the statistical details of state wise share of Solid Waste Generation in India. In recent years, India's generation of municipal solid waste has increased at a rate faster than its population growth. In India, the amount of municipal solid trash generated per person each day varies from 100 g and in small towns it is 500 g in large

towns. The waste has between 13 and 20 per cent is recyclable material (CPCB, 1994/95). According to the Central Pollution Control Board survey, the combined amount of municipal garbage generated in 1997 by Class I and II cities was approximately 18 million tons (CPCB, 2000). The reason for this escalating trend of municipal solid waste generation is a mix of the changing lifestyles, food habits and changes in standard of living (Singhal, 2000). In India, there are 4,378 towns and cities. In 2011, the estimated population residing in Indian cities was 377 million. India's urban population is growing at a rapid pace. According to estimates from the Central Public Health and Environmental Engineering Organization (CPHEEO), between 0.2 and 0.6 kg of waste are generated per person each day in Indian cities and towns. Maharashtra has the in the top highest recorded for generation of municipal solid trash (22164 MT/Day), whereas Lakshadweep has the lowest recorded generation of solid waste.

| Year    | Gap in Solid Waste Management (%) |
|---------|-----------------------------------|
| 2015-16 | 40.99                             |
| 2016-17 | 79.78                             |
| 2017-18 | 9.38                              |
| 2018-19 | 30.35                             |
| 2019-20 | 25.82                             |
| 2020-21 | 31.70                             |
| TOTAL   | 218.02                            |

**Source: - cpcb.nic.in**



**Source- Computed by the researcher in Ex-**

cel.

The above table and graph no. 2 depicts the percentage of Gap in Solid Waste Management in India and the information has given in table above is showing the actual situation about the Percentage gap in solid waste management has been calculated for the period 2015-21, the details of which are given some of statistical information regarding the trend in the gap is illustrated. Decreasing trend in gap in solid waste management has been observed up to 2019-20 during the last six years wherein percentage gap in Solid Waste Management has decreased from 40.99% in 2015-16 to 25.82% in 2019-20 and slightly increased to 31.70 % in 2020-21.

#### CONCLUSION AND POLICY SUGGESTIONS

Time has come to encourage technology based entrepreneurship for effective "Waste Management Authorities must protect fundamental rights of citizens and citizens also must perform their fundamental duties to their best practices. Most of the populated areas show the picture of sadly managed and uncontrolled dumpsites. Lackadaisical attitude of the common people has compounded the problem and have left the entire responsibility to the civic authorities. Environmental degradation has led to unregulated use of environment and its wide spread. Absence of complete market makes use of alternative method essential to find solution for the environmental issues. In fact, implementation of environment laws is yet to impact on ecosystem and, therefore, on the health and living conditions of the citizens. Waste generation basically depends on population, climate, urbanization, socio economic criteria, etc. The Government should simplify the rules and encourage all the citizens to practice the same in their households and may arrange for reward to the best Waste Management practitioner. Methods like vermicomposting, energy generation from solar cells and e-wastes using recycled water for household practices can be easily preached to the common people. This enhances

the fertility of our soil, reduces environmental pollution, and increases ground water level ultimately making our environment" (Das, 2020) a safe haven to live. This will be the real legacy we have to leave behind for the forthcoming generation.

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## Digital Financial Literacy in the 21<sup>st</sup> Century: The Pivotal Role of Financial Institutions

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### Abstract:

In the rapidly evolving digital economy, financial literacy has transcended traditional boundaries, necessitating a new focus on digital financial literacy (DFL). This study explores the critical role financial institutions play in promoting DFL, which is essential for empowering individuals to navigate the complexities of digital financial services. As digital platforms become the primary medium for financial transactions, the need for comprehensive financial education has never been more pressing. Financial institutions, with their expertise, resources, and reach, are uniquely positioned to bridge the gap between technological advancements and consumer understanding. This research examines the strategies employed by financial institutions such as educational programs, digital tools, and partnerships to enhance DFL among diverse populations. It also investigates the challenges these institutions face, including technological barriers, low consumer engagement, and the digital divide. Through a mixed-methods approach, combining qualitative interviews with financial experts and quantitative surveys of consumers, the study highlights the transformative impact of DFL initiatives on financial inclu-

sion and economic empowerment. The findings underscore the importance of collaborative efforts between financial institutions, governments, and educational organizations to create a digitally literate society. Ultimately, this paper argues that financial institutions are not merely service providers but pivotal educators in the digital age, shaping a financially inclusive future. The study contributes to the growing body of literature on financial literacy by emphasizing the intersection of finance, technology, and education in the 21st century.

**Keywords:** Digital Financial Literacy, Financial Inclusion, Financial Institutions

### Introduction:

In the 21st century, the rapid digitization of financial services has revolutionized the way individuals and businesses interact with money. From mobile banking and digital wallets to crypto currency and online investment platforms, the financial landscape has become increasingly complex and technology-driven. This transformation has underscored the critical importance of digital financial literacy (DFL)—the ability to understand, access, and effectively use digital financial services. As the world moves toward a cashless economy, financial literacy is no longer confined to traditional concepts like budgeting and saving; it now encompasses digital skills, cyber security awareness, and the ability to navigate fintech innovations.

Financial institutions, including banks, credit unions, and non-banking financial companies (NBFCs), have emerged as key stakeholders in this evolving ecosystem. With their extensive reach, expertise, and resources, they are uniquely positioned to promote DFL among consumers. By offering educational programs, user-friendly digital tools, and personalized guidance, financial institutions can empower individuals to make informed decisions in the digital financial space. However, despite their potential, many institutions face challenges such as technological barriers, low consumer engagement,

and the persistent digital divide, particularly in underserved and rural communities.

This study seeks to explore the pivotal role of financial institutions in advancing digital financial literacy, with a focus on their strategies, challenges, and impact on financial inclusion. By examining the intersection of finance, technology, and education, this research aims to contribute to the growing discourse on how financial institutions can serve as catalysts for a digitally literate and financially inclusive society. In doing so, it highlights the transformative potential of DFL in fostering economic empowerment and sustainable development in the digital age.

#### **Objectives of the study:**

To examine strategies used by financial institutions to promote digital financial literacy.

To identify challenges in enhancing digital financial literacy, especially in underserved areas.

To evaluate the impact of digital financial literacy on inclusion and economic growth.

#### **Research Methodology:**

This study adopted an exploratory and descriptive research design to analyze strategies, identify challenges and evaluate the impact of DFL initiatives.

#### **Primary Data:**

Survey Method: Structured questionnaires was distributed to a sample of consumers (both urban and rural) to assess their level of digital financial literacy, awareness of institutional initiatives and perceived challenges.

Interviews method: Semi-structured interviews was conducted with key stakeholders, including representatives from banks, NBFCs, fintech companies and policymakers to gain insights into their strategies and challenges in promoting DFL.

#### **Secondary Data:**

Literature Review: Existing studies, reports and publications on digital financial literacy and the role of financial institutions were reviewed to

provide context and support primary findings.

#### **Review of Literature:**

Sethi A. and Singh A. (2024) in research article entitled 'Digital Financial Literacy in India: A review and need analysis' researcher opinions Digital financial literacy is vital for India's inclusion, yet challenges like the digital divide and lack of awareness hinder progress, requiring collaborative efforts.

T. Ravikumar, B. Suresha, N. Prakash, Kiran Vazirani, and T.A. Krishna conducted a study on "Digital Financial Literacy Among Adults in India: Measurement and Validation." Digital financial literacy (DFL) in India depends on knowledge, risk awareness, and skills, essential for effective use of digital financial services (DFS). (Ravikumar et al., 2024).

Bajaj S. (2015) in her research paper Financial literacy Imparting financial education is a very important task of banking now days as lack of financial literacy is one of the main reasons of financial exclusion of the financial system. As financial literate person is having the ability to take sound financial decisions for their future.

F. Koefer, A. Bokkens, M. Preziuso and M. Ehrenhard in Working paper (2024) Future research should expand European samples, study digital literacy solutions, and guide MFIs' digital transformation for enhanced financial inclusion.

#### **Theoretical Background:**

The concept of digital financial literacy (DFL) is grounded in the intersection of financial literacy, digital literacy, and behavioral economics, offering a comprehensive framework to understand its significance in the 21st century. Financial literacy, traditionally defined as the ability to make informed and effective financial decisions, has evolved with the advent of digital technologies. Digital financial literacy extends this concept by incorporating the skills and knowledge required to navigate digital financial services (DFS) such as mobile banking, digital

wallets, and online investment platforms. This evolution reflects the growing complexity of the financial ecosystem, where technology plays a central role in shaping consumer behavior and financial inclusion.

The **Technology Acceptance Model (TAM)** and the **Unified Theory of Acceptance and Use of Technology (UTAUT)** provide foundational insights into the adoption of digital financial tools. According to TAM, perceived usefulness and ease of use are critical factors influencing the adoption of new technologies (Davis, 1989). UTAUT expands this by emphasizing the role of social influence, facilitating conditions, and behavioral intention in technology adoption (Venkatesh et al., 2003). These theories highlight the importance of user-friendly interfaces, awareness campaigns, and supportive infrastructure in promoting DFL. For instance, financial institutions can leverage these insights to design intuitive digital platforms and educational programs that enhance consumer confidence and adoption rates.

The **Capability Approach**, developed by Amartya Sen, offers another lens to understand DFL. This approach emphasizes the importance of empowering individuals to achieve their full potential by providing access to resources and opportunities. In the context of DFL, financial institutions act as enablers by equipping individuals with the knowledge and skills needed to participate in the digital economy. By fostering DFL, these institutions can enhance individuals' capabilities to make informed financial decisions, thereby promoting economic empowerment and reducing inequalities.

The **Diffusion of Innovations Theory** (Rogers, 2003) further enriches the theoretical framework by explaining how new technologies spread within a society. According to this theory, the adoption of innovations follows a predictable pattern, with early adopters influencing the broader population. Financial institutions play a pivotal role in this process by targeting inter-

ventions to accelerate the adoption of DFS among late adopters, particularly in underserved and rural areas. This theory underscores the need for tailored strategies to address barriers such as lack of awareness, trust, and access to digital infrastructure.

Additionally, the **Social Cognitive Theory** (Bandura, 1986) highlights the role of observational learning and self-efficacy in shaping behavior. In the context of DFL, individuals are more likely to adopt digital financial tools if they observe others successfully using them and feel confident in their ability to do so. Financial institutions can leverage this by creating peer-led educational programs, showcasing success stories, and providing hands-on training to build consumer confidence. The integration of these theories provides a robust framework for understanding the determinants and outcomes of DFL. Digital knowledge, financial knowledge, awareness of risks, and practical skills are key components of DFL, as highlighted by recent studies (Ravikumar et al., 2024). These elements are essential for enabling individuals to navigate the complexities of DFS, avoid financial losses, and protect their privacy.

In conclusion, the theoretical background of DFL is multifaceted, drawing from models of technology adoption, capability development, innovation diffusion, and social learning. These theories collectively emphasize the pivotal role of financial institutions in promoting DFL, not only as service providers but also as educators and enablers of financial inclusion. By addressing barriers such as the digital divide and low awareness, financial institutions can harness the transformative potential of DFL to create a more inclusive and empowered society.

### **1. Strategies used by Financial Institutions to Promote Digital Financial Literacy**

There are various strategies the financial institutions to promote DFL are as follows:

**Educational Programs:** Many institutions offer

workshops, seminars, and online courses to educate consumers about digital financial tools, cybersecurity, and responsible financial behavior.

**Digital Tools:** Institutions develop user-friendly mobile apps, interactive platforms, and chatbots to simplify the use of digital financial services (DFS) and provide real-time assistance.

**Partnerships:** Collaborations with fintech companies, educational organizations, and government agencies help expand the reach and effectiveness of DFL initiatives.

**Awareness Campaigns:** Financial institutions use social media, television, and community outreach programs to raise awareness about the benefits and risks of DFS.

## 2. Challenges in Enhancing Digital Financial Literacy

Despite the efforts of financial institutions, several barriers hinder the promotion of DFL, particularly in underserved and rural communities. This objective seeks to uncover these challenges and their underlying causes.

**Digital Divide:** Limited access to digital infrastructure, such as smartphones and internet connectivity, restricts the adoption of DFS in rural and remote areas.

**Low Awareness:** Many consumers, especially in underserved regions, lack awareness of the availability and benefits of digital financial services.

**Technological Barriers:** Older adults and less tech-savvy individuals often struggle to navigate complex digital platforms, leading to low engagement.

**Trust Issues:** Concerns about data privacy, cybersecurity, and fraud deter consumers from adopting DFS.

**Socioeconomic Factors:** Poverty, illiteracy, and cultural norms further exacerbate the challenges in promoting DFL.

## 3. Impact of Digital Financial Literacy on Inclusion and Economic Growth

The ultimate goal of promoting DFL is to

foster financial inclusion and drive economic growth. This objective assesses the transformative impact of DFL initiatives on individuals, communities, and the broader economy.

**Financial Inclusion:** DFL empowers individuals to access and use formal financial services, reducing reliance on informal and often exploitative systems.

**Economic Empowerment:** By enabling informed financial decisions, DFL helps individuals save, invest, and build assets, contributing to their economic well-being.

**Reduced Transaction Costs:** Digital financial services lower the costs and inconveniences associated with traditional banking, making financial transactions more efficient.

**Entrepreneurship and Innovation:** DFL fosters a culture of entrepreneurship by providing individuals with the tools and knowledge to access credit and manage finances digitally.

**National Growth:** At a macroeconomic level, widespread DFL contributes to economic growth by increasing financial system participation, reducing poverty, and promoting sustainable development.

### Findings:

1. Financial institutions play a pivotal role in promoting digital financial literacy (DFL) through educational programs, digital tools, and partnerships, but their reach is often limited in underserved and rural areas.
2. The digital divide and low awareness are significant barriers to DFL, particularly in rural regions, where access to digital infrastructure and financial services remains inadequate.
3. DFL initiatives have a transformative impact on financial inclusion, empowering individuals to access formal financial services and make informed decisions.
4. Collaboration between financial institutions, governments, and educational organizations is essential to address challenges and scale DFL efforts effectively.

### Suggestions:

1. Expand Outreach in Underserved Areas: Financial institutions should prioritize rural and marginalized communities by investing in digital infrastructure and conducting localized awareness campaigns.
2. Simplify Digital Platforms: Develop user-friendly interfaces and provide hands-on training to help less tech-savvy individuals navigate digital financial services confidently.
3. Strengthen Public-Private Partnerships: Collaborate with governments, fintech companies, and NGOs to design and implement scalable DFL programs.
4. Focus on Cybersecurity Education: Educate consumers about data privacy and fraud prevention to build trust in digital financial services.

#### Conclusion:

Digital financial literacy (DFL) is a cornerstone of financial inclusion and economic empowerment in the 21st century. Financial institutions, as key stakeholders, have the expertise and resources to bridge the digital divide and promote DFL. However, challenges such as low awareness, technological barriers, and the digital divide persist, particularly in underserved areas. Collaborative efforts, targeted interventions, and user-centric strategies are essential to create a digitally literate and financially inclusive society, driving sustainable economic growth.

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## Dry matter and Growth parameters of different lablab bean genotypes as influenced by different sowing date under Konkan Rabi condition

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### Abstract

The field experiment was conducted by Educational and Research Farm, Department of Agricultural Botany, College of Agriculture, Dapoli, during rabiseason 2015-2016 and 2016-2017. The investigation was aimed at Dry matter and growth parameters of five lablab bean genotypes (viz. genotype 63, genotype 83, genotype 54, genotype 84 and a check Konkan Wal-2) in three sowing dates (viz. 5<sup>th</sup> Nov, 15<sup>th</sup> Nov and 25<sup>th</sup> Nov) under Konkan rabi condition. The whole experiment was analyzed in split plot design in four replications and five genotypes. Among the five genotypes, genotype G 3 contributed the highest absolute growth rate (0.1155 g/day/plant), relative growth rate (0.00324g/g/plant), net assimilation rate (0.003860 g/dm<sup>2</sup>/day) and specific leafweight (5.01 cm<sup>2</sup>/g) significantly differing from remaining genotypes including check genotype Konkan wal-2.

### Introduction:

Lablab bean has the capacity to fix atmospheric nitrogen in the soil and it can do relatively well even under poor soil fertility conditions

since it is a leguminous crop. It has importance in human nutrition. It contains around 24.9 per cent protein, being next to soybean and 2 to 2.5 times as much in cereals. Its amino acid composition is also moderately well balanced, with high lysine content (6.1%). A mixed diet of cereal and pulse has more biological value than either component alone and can meet the requirement of the protein of animal origin.

The entire species has been distributed over the different parts of India, Australia, Africa, and Latin America. India is the major pulse growing country in the world sharing about 25% of total production and 32% of global acreage in the world. In India pulses are grown on an area of 24.31 million ha with a production of 19.27 million tonnes of grains with an average yield of 631.9 kg/ha. Maharashtra ranks first in acreage and production of pulses followed by Madhya Pradesh, Uttar Pradesh, Rajasthan, Orissa, Haryana, Gujarat, Karnataka, Tamilnadu and Andhra Pradesh. In Maharashtra, the total pulse production was 34.46 lakh tonnes, which was produced from 38.26 lakh ha with an average production of 900 kg/ha in the year 2015-2016 while in Konkan region total pulse area was 27.2 thousand ha which produced 16.70 thousand tonnes (Anonymous, 2016). Lablab bean is grown in all the districts of Konkan region of Maharashtra viz. Thane, Palghar, Raigad, Ratnagiri and Sindhudurg with gram, lentil, horse gram with an average productivity of 537 kg/ha (Anonymous, 2016).

Lablab bean (*Lablab purpureus* L.) can grow in a variety of soils, from sand to clay, in a pH range of 4.5–7.5 (Cook et al., 2005). It does not grow well in saline or poorly-drained soils, but it grows better than most legumes under acidic conditions (Shivachiet al., 2012). It can continue to grow in drought or shady conditions and will grow in areas with an average annual rainfall 25–120 cm (Shrivasta et al., 2005). It is more drought resistant than other similar legumes like common beans (*Phaseolus vulgaris*) and cowpea (Mass et al., 2010), and can access soil water 6 feet deep (Shrivasta et al., 2005).

In Konkan region, lablab bean is widely grown during rabi season mainly for grain pur-

pose in small pockets especially on residual moisture. Lablab bean probably the highest price pulse crop is cultivated by farmers, immediately after harvest of paddy. During the early phase of growth, soil moisture is adequate for germination and vegetative growth but during later phase of growth soil moisture is depleted and the plant goes under the stress of different degrees. All India Co-ordinated Research Project on pulses has the mandate of research for twelve major pulses viz. moth bean, rice bean in Kharif, chickpea, lentil, field pea and Lathyrus in Rabi while pigeonpea, mungbean, cowpea, horsegram and rajmabean in both Kharif and Rabi. Hence, due attention to research in wal is inadequate. Being economic crop of the region, the research on wal has its own significance and need to put on priority.

In Konkan region, until today there are only two released varieties of lablab bean by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli. Further the changing climate poses the major constraint in yield improvement of the crop. In recent years, the shift in major climatic factors viz. rainfall, humidity, the temperature is being witnessed in Konkan region. Five out of recent seven years registered the extreme events of rainfall pattern. Since wal is grown in Rabi season after paddy harvesting, prolonged rainfall beyond October till November push forward normal sowing time of wal whereas early withdrawal of rains forces to go for early sowing on residual moisture. Considering the importance of crop to the region, the elaborate breeding programme has been undertaken by Department of Agricultural Botany, Dr. B.S.K.K.V., Dapoli in respect of an improvement in growth and yield characters of the crop. Some genotypes are identified as high yielder by selections. At such stage, estimating physiological efficiencies of such selected genotypes under varied climatic conditions would be supportive in identifying promising genotypes for cultivation in Konkan region.

#### Material and Method:

Dry matter and growth parameter of different lablab bean genotypes as influenced by different sowing date under Konkan Rabi was carried out at Agriculture Botany Research Farm,

Department of Agriculture Botany, College of Agriculture, Dapoli during 2015-2016 and 2016-2017. The investigation was aimed at morphological, physiological and biochemical characterization of five lablab bean genotypes (viz. genotype 63, genotype 83, genotype 54, genotype 84 and a check Konkan Wal-2) in three sowing dates (viz. 5<sup>th</sup> Nov, 15<sup>th</sup> Nov and 25<sup>th</sup> Nov) under Konkan rabi condition with an object to study extent of thermo and photosensitivity of different lablab bean genotypes. The whole experiment was analyzed in split plot design in four replications, plot size: 3 × 1.5 m<sup>2</sup>, spacing: 30 × 15 cm and fertilizer dose: 25 : 50 : 00 kg/ha.

**Table.1. Genotype, cross, pedigree and character of selected lablab bean genotypes.**

| Sr. No. | Genotypes    | Cross           | Pedigree           | Character     |
|---------|--------------|-----------------|--------------------|---------------|
| 1       | Genotype 63  | DPLW61 X DPLW29 | DPLW-2010-6-5-3-20 | Bushy basal   |
| 2       | Genotype 84  | DPLW46 X DPLW61 | DPLW-2010-9-1-2-9  | Viny overall  |
| 3       | Genotype 53  | DPLW15 X DPLW29 | DPLW-2010-5-4-2-20 | Viny erect    |
| 4       | Genotype 83  | DPLW48 X DPLW51 | DPLW-2010-8-4-2-19 | Viny terminal |
| 5       | Konkan wal-2 | -               | -                  | -             |

#### Dry matter studies

For dry matter studies, five plants were selected randomly at each sampling and were separated into stem, leaves and pod (except first sampling). These were properly labeled and dried in a hot air oven at 80°C for first one hour and then at constant temperature at 60°C. When plant parts are completely dried, the dry weights were recorded separately for each plant part i.e. stem, leaves and pod. Summing up the weight of stem, leaves and pod of the same plant gave the total dry matter per plant. Per cent distribution of dry matter in different plant parts i.e. stem, leaves and pod was calculated by considering total dry matter as 100 per cent.

#### Absolute growth rate (AGR)

AGR was estimated as per method described by Watson D. J. (1958) and expressed as g/day.

$$AGR = \frac{W_2 - W_1}{t_2 - t_1} \text{ (g/day)}$$

$W_1$  = Dry weight of plant (g) at time  $t_1$

$W_2$  = Dry weight of plant (g) at time  $t_2$

#### Relative growth rate (RGR)

It is the rate of increase in dry weight per unit dry matter present per unit time and

expressed as  $\text{g g}^{-1} \text{ day}^{-1}$ . RGR was calculated by the formula given by Briggs et al. (1919).

$$\text{RGR} = \frac{(\text{Log}_e w_2 - \text{Log}_e w_1)}{(t_2 - t_1)} (\text{g g}^{-1} \text{ day}^{-1})$$

Where,  $w_2$  and  $w_1$  represents total dry matter per plant at  $t_2$  and  $t_1$  times, respectively.

#### Net assimilation rate (NAR)

The relationship between leaf area and dry matter accumulation was measured with the help of net assimilation rate and it was calculated by the formula as suggested by Gregory (1926) and expressed as  $\text{g dm}^{-2} \text{ day}^{-1}$ .

$$\text{NAR} = \frac{(w_2 - w_1)}{(L_2 - L_1)} \times \frac{(\text{Log}_e L_2 - \text{Log}_e L_1)}{(t_2 - t_1)} (\text{g dm}^{-2} \text{ day}^{-1})$$

Where,  $w_2$  and  $w_1$  represents total dry matter per plant and  $L_2$  and  $L_1$  denote the leaf area per plant at  $t_2$  and  $t_1$  times, respectively.

#### Result and Dissections:

##### Dry matter accumulation rate:

In growth, dry matter production plays a key role. Dry matter production, particularly in reproductive parts is an important yield contributing character for which the basic vegetative phase is essential for the development of reproductive organs. The pattern of dry matter accumulation and distribution into several plant parts has been of phenomenal interest to the research workers engaged in yield analysis (Kelkar S., 2017). The data on dry matter analysed at different intervals, would give the picture in quantitative terms regarding accumulation and partitioning of the total dry matter among the plant parts through the growth period of the crop. Each part of the plant has its specific function and utility and hence, the progressive accumulation of dry matter in various parts of the plant was studied (Table 2 to 4).

In present investigation, it was found that, genotypes varied significantly for dry matter distribution. The stem which is the main translocation organ of the photo-assimilates, has great influence on the production of total dry matter. Leaf dry matter increased continuously up to 90 DAS (18.06 g) and it reduced later till harvesting indicating rapid transfer of dry matter from leaves to stem. Genotypes varied significantly for stem dry weight. In general, at 90 DAS maximum dry matter accumulation was found higher in leaves followed by stem and roots for all the sowing dates and genotypes. But at harvesting, dry matter of leaves was considerably lower than

90 DAS which is due to leaf fall at maturity. Maximum leaf dry weight at 90 DAS was found in sowing time  $S_1$  (18.067 g) and genotype  $G_3$  (19.46 g) in pooled data. Genotypes like  $G_3$  (Genotype 53) which had more leaf area had also maximum leaf dry weight.

Stem dry matter found to be increased till harvesting. At- harvest DAS, maximum stem dry weight was found with sowing time  $S_1$  (5.099 gm.) and in genotype  $G_3$  (5.84 gm). Similar results were reported by TarunKanti (1987) in lablab bean genotypes and Borkar (2011) in groundnut genotypes.

It was also noted that genotypes significantly differed for total dry weight per plant during all stages of growth. Maximum total dry weight was observed with sowing time  $S_1$  (23.166 g) and in genotype  $G_3$  (25.30 g) indicating the large variation among genotypes for total dry weight. Similar results were also reported by Shinde (1998) and Kelkar S. (2017) in lablab while Naim (2007) and ErkutPeksen (2002) in cowpea genotypes.

Higher radiation use of efficiency was found in sowing time  $S_1$  (5<sup>th</sup> Nov.) which might be contributory to better conservation of light into dry matter with better yield component. It is in similarity with the reports by Singh et al. (2007) and Kumar et al. (2008b) in Soybean.

##### Growth analysis

Growth is a complex phenomenon involving complicated changes; ultimately, leading to variation in yield, therefore a complete analysis of biological yield is an important aspect of physiological studies (Kelkar S. 2017). It is necessary to investigate the cause of such variation both during the early and late period of crop growth through computation of growth indices such as absolute growth rate, relative growth rate and net assimilation rate.

##### Absolute growth rate

The absolute growth rate is a daily increment in the dry matter over a given period of time (Redford 1967). In present study irrespective of genotypes, absolute growth rate differed significantly among the three sowing times at 60-90 DAS and 90 DAS- at harvest stage but not at 30-60 DAS. It decreased with late sowing dates, during both the years and pooled analy-

sis. Significantly 27.51 % higher absolute growth rate over sowing time  $S_3$  was observed in sowing time  $S_1$  (0.0956 g/day/plant) followed by  $S_2$  (0.0712 g/day/plant) which might be due to cold stress experienced by late sown crop at initial growth stages (Max. 32.4°C, Min. 12.9°C) while heat stress struck during later stages of maturity (Max. 37.2°C, Min. 22.1°C). Similarly irrespective of sowing dates, among five genotypes, genotype  $G_3$  exhibited significantly 12.51 % higher absolute growth rate (0.1155 g/day/plant) over check genotype Konkan wal-2, which was at par with  $G_1$  (0.1127 g/day/plant) and could be attributed to higher dry matter accumulation potential of the genotype  $G_3$ . These results are in accordance with the research carried out by Rao (1990), Shinde (1998), Hasan et al. (2014), Hossain and Hossain (2014) in lablab bean while Parabet et al. (1991) in cowpea; Mwanamwenge et al. (1998) in faba bean and Mustapha et al. (2014) in soybean.

#### Relative growth rate:

For evaluating the efficiency of the existing biomass in producing new biomass, the relative growth rate (RGR) is a valuable parameter. The relative growth rate is an overall measure of the rate of increase in dry weight per unit in dry weight (Briggs et al. 1921).

In present study irrespective of genotypes, relative growth rate differed significantly among the three sowing times and it decreased with late sowing dates. Significantly higher relative growth rate (0.0027 g/g/plant) at harvest stage, was observed in sowing time  $S_1$  (5<sup>th</sup> Nov.) followed by  $S_2$  (15<sup>th</sup> Nov.) i.e. 0.0026 g/g/plant. Whereas, lower relative growth rate (0.0021 g/g/plant) was noted in  $S_3$  sowing time. A reduction of 28.57 % in relative growth rate of late sown crop as compared to early sown one might be due to cold stress experienced by late sown crop at initial growth stages (Max. 32.4°C, Min. 12.9°C) while heat stress struck during later stages of maturity (Max. 37.2°C, Min. 22.1°C). Similarly irrespective of sowing dates, among five genotypes, genotype  $G_3$  exhibited significantly maximum relative growth rate (0.0032 g/g/plant), which was at par with  $G_4$  (0.0027 g/g/plant). Whereas the minimum relative growth rate (0.0015 g/g/plant) was recorded in  $G_5$ . The

increase of 11.33 % in relative growth rate of  $G_3$  was observed over check genotype Konkan wal-2. The relative growth rate is usually reduced towards progressive growth stages of plant in all the sowing dates (Table 11) which might be due to less leafy biomass produced and assimilates transferred towards grain production and ripening and because net carbon losses occur through respiration of shaded leaf layers. These results are similar to those reported by Rao (1990), Shinde (1998), Groteluschen (2014), Hasan et al. (2014), Hossain and Hossain (2014), Shirodkar M. (2016) and Kelkar S. (2017) in lablab bean and also in other pulses as Parabet et al. (1991) in cowpea; Mwanamwenge et al. (1998) in faba bean; Ozalkan (2010) in chickpea and Mustapha et al. (2014) in soybean.

#### Net assimilation rate:

Net assimilation rate is the rate of increase in dry weight per unit leaf area assuming that both dry weight and leaf area increased exponentially (Gregory 1926).

In present study irrespective of genotypes, net assimilation rate differed significantly at 60-90 DAS and 90-at harvest stage among the three sowing times and it decreased with late sowing dates. During both the years and pooled basis except in Second year (2016) at 60-90 DAS significantly higher net assimilation rate (0.003535 g/dm<sup>2</sup>/day) at harvest stage was observed in sowing time  $S_1$  followed by  $S_2$  (0.003504 g/dm<sup>2</sup>/day). Whereas, the lowest net assimilation rate (0.003860 g/dm<sup>2</sup>/day) was observed in  $S_3$  sowing time. This 12.75 % reduction in net assimilation rate of sowing time  $S_3$  with respect to  $S_1$  could be attributed to cold stress experienced by late sown crop at initial growth stages (Max. 32.4°C, Min. 12.9°C) while heat stress during later maturation stages (Max. 37.2°C, Min. 22.1°C). Similarly irrespective of sowing dates, among five genotypes, genotype  $G_3$  exhibited significantly maximum net assimilation rate (0.003860 g/dm<sup>2</sup>/day), followed by  $G_5$  (0.003669 g/dm<sup>2</sup>/day) at harvest stage. Whereas the minimum net assimilation rate (0.002683 g/dm<sup>2</sup>/day) was recorded in  $G_4$ . The increase of 5.20 % in net assimilation rate of  $G_3$  over check genotype Konkan wal-2 might be the indicative of variation in the genetic constitu-

tion of genotypes. Similar results were coated by Shirodkar M. (2016) and Kelkar S. (2017) in Lablab bean and Ozalkan (2010) in chickpea.

### Conclusion:

Dry matter and growth parameter revealed a greater extent of variability among different lablab bean genotypes as influenced by three sowing dates.

**Table 2. Mean leaf dry weight (g) of Lablab bean as influenced by the different treatment.**

| Treatments                 |                               | 30 DAS |       |        | 60 DAS |       |        |
|----------------------------|-------------------------------|--------|-------|--------|--------|-------|--------|
|                            |                               | 2015   | 2016  | Pooled | 2015   | 2016  | Pooled |
| <b>Sowing time</b>         |                               |        |       |        |        |       |        |
| S <sub>1</sub>             | 05 <sup>th</sup> Nov.         | 1.611  | 1.526 | 1.568  | 10.901 | 8.811 | 9.499  |
| S <sub>2</sub>             | 15 <sup>th</sup> Nov.         | 1.228  | 1.361 | 1.344  | 9.285  | 8.219 | 9.048  |
| S <sub>3</sub>             | 25 <sup>th</sup> Nov.         | 1.396  | 1.396 | 1.396  | 8.567  | 8.096 | 8.393  |
|                            | S.E±                          | 0.08   | 0.024 | 0.038  | 0.26   | 0.15  | 0.14   |
|                            | C.D at 5%                     | 0.25   | 0.070 | 0.11   | 0.75   | 0.44  | 0.42   |
| <b>Genotypes</b>           |                               |        |       |        |        |       |        |
| G <sub>1</sub>             | Genotype 63                   | 1.56   | 1.38  | 1.49   | 8.26   | 7.63  | 7.95   |
| G <sub>2</sub>             | Genotype 84                   | 1.26   | 1.54  | 1.40   | 10.19  | 7.80  | 9.00   |
| G <sub>3</sub>             | Genotype 53                   | 1.60   | 1.87  | 1.71   | 11.26  | 10.03 | 10.64  |
| G <sub>4</sub>             | Genotype 83                   | 1.35   | 1.57  | 1.46   | 8.36   | 8.44  | 8.40   |
| G <sub>5</sub>             | Konkan Wal-2                  | 1.28   | 1.28  | 1.28   | 9.85   | 7.98  | 8.91   |
|                            | S.E±                          | 0.26   | 0.05  | 0.05   | 0.26   | 0.24  | 0.41   |
|                            | C.D at 5%                     | 0.75   | 0.14  | 0.15   | 0.075  | 0.70  | 1.19   |
| <b>Interaction effects</b> |                               |        |       |        |        |       |        |
|                            | S <sub>1</sub> G <sub>1</sub> | 1.96   | 1.26  | 1.61   | 8.30   | 7.95  | 8.12   |
|                            | S <sub>1</sub> G <sub>2</sub> | 1.42   | 1.43  | 1.43   | 9.33   | 7.99  | 8.66   |
|                            | S <sub>1</sub> G <sub>3</sub> | 1.95   | 1.88  | 1.91   | 7.07   | 9.86  | 8.46   |
|                            | S <sub>1</sub> G <sub>4</sub> | 1.37   | 1.55  | 1.46   | 7.54   | 7.61  | 7.58   |
|                            | S <sub>1</sub> G <sub>5</sub> | 1.35   | 1.52  | 1.44   | 10.60  | 7.68  | 9.14   |
|                            | S <sub>2</sub> G <sub>1</sub> | 1.39   | 1.84  | 1.61   | 8.53   | 7.45  | 7.99   |
|                            | S <sub>2</sub> G <sub>2</sub> | 1.03   | 1.97  | 1.50   | 11.88  | 7.43  | 9.65   |
|                            | S <sub>2</sub> G <sub>3</sub> | 1.30   | 1.93  | 1.61   | 13.80  | 9.72  | 11.76  |
|                            | S <sub>2</sub> G <sub>4</sub> | 1.18   | 1.30  | 1.24   | 9.03   | 8.47  | 8.75   |
|                            | S <sub>2</sub> G <sub>5</sub> | 1.26   | 1.27  | 1.26   | 11.27  | 7.41  | 9.34   |
|                            | S <sub>3</sub> G <sub>1</sub> | 1.47   | 1.04  | 1.26   | 7.95   | 7.49  | 7.72   |
|                            | S <sub>3</sub> G <sub>2</sub> | 1.32   | 1.24  | 1.28   | 9.38   | 7.98  | 8.68   |
|                            | S <sub>3</sub> G <sub>3</sub> | 1.44   | 1.78  | 1.61   | 12.90  | 10.52 | 11.71  |
|                            | S <sub>3</sub> G <sub>4</sub> | 1.50   | 1.86  | 1.68   | 8.50   | 9.23  | 8.86   |
|                            | S <sub>3</sub> G <sub>5</sub> | 1.24   | 1.05  | 1.15   | 7.69   | 8.84  | 8.26   |
|                            | S.E±                          | 0.16   | 0.08  | 0.09   | 0.64   | 0.42  | 0.41   |
|                            | C.D at 5%                     | 0.47   | 0.24  | 0.25   | 1.88   | 1.21  | 1.19   |
|                            | General Mean                  | 1.41   | 1.53  | 1.47   | 9.58   | 8.38  | 8.98   |

Genotype 63 - DPLW61 X DPLW29, Genotype 84 - DPLW46 X DPLW61, Genotype 53 - DPLW15 X DPLW29, Genotype 83 - DPLW48 X DPLW51, Konkan wal-2 – Check

**Continued.....**

| Treatments                 |                               | 90 DAS |        |        | At harvest |        |        |
|----------------------------|-------------------------------|--------|--------|--------|------------|--------|--------|
|                            |                               | 2015   | 2016   | Pooled | 2015       | 2016   | Pooled |
| <b>Sowing time</b>         |                               |        |        |        |            |        |        |
| S <sub>1</sub>             | 05 <sup>th</sup> Nov.         | 17.679 | 18.454 | 18.067 | 13.694     | 14.469 | 14.082 |
| S <sub>2</sub>             | 15 <sup>th</sup> Nov.         | 17.354 | 18.131 | 17.742 | 13.369     | 14.146 | 13.757 |
| S <sub>3</sub>             | 25 <sup>th</sup> Nov.         | 17.313 | 17.044 | 17.179 | 13.328     | 13.059 | 13.194 |
|                            | S.E±                          | 0.11   | 0.14   | 0.10   | 0.11       | 0.14   | 0.10   |
|                            | C.D at 5%                     | 0.33   | 0.40   | 0.28   | NS         | 0.40   | 0.28   |
| <b>Genotypes</b>           |                               |        |        |        |            |        |        |
| G <sub>1</sub>             | Genotype 63                   | 16.63  | 17.53  | 17.08  | 12.65      | 13.55  | 13.10  |
| G <sub>2</sub>             | Genotype 84                   | 17.40  | 17.29  | 17.34  | 13.42      | 13.30  | 13.36  |
| G <sub>3</sub>             | Genotype 53                   | 19.43  | 19.49  | 19.46  | 15.45      | 15.50  | 15.47  |
| G <sub>4</sub>             | Genotype 83                   | 16.60  | 17.85  | 17.23  | 12.61      | 13.87  | 13.24  |
| G <sub>5</sub>             | Konkan Wal-2                  | 17.18  | 17.23  | 17.20  | 13.19      | 13.24  | 13.22  |
|                            | S.E±                          | 0.19   | 0.25   | 0.17   | 0.19       | 0.24   | 0.17   |
|                            | C.D at 5%                     | 0.58   | 0.72   | 0.50   | 0.55       | 0.72   | 0.50   |
| <b>Interaction effects</b> |                               |        |        |        |            |        |        |
|                            | S <sub>1</sub> G <sub>1</sub> | 16.69  | 17.05  | 18.30  | 12.70      | 13.06  | 12.88  |
|                            | S <sub>1</sub> G <sub>2</sub> | 18.12  | 17.76  | 17.94  | 14.13      | 13.77  | 13.95  |
|                            | S <sub>1</sub> G <sub>3</sub> | 19.33  | 20.80  | 20.02  | 15.34      | 16.81  | 16.08  |
|                            | S <sub>1</sub> G <sub>4</sub> | 17.13  | 19.22  | 17.66  | 13.15      | 15.23  | 14.19  |
|                            | S <sub>1</sub> G <sub>5</sub> | 17.13  | 17.46  | 16.74  | 13.15      | 13.47  | 13.31  |
|                            | S <sub>2</sub> G <sub>1</sub> | 16.99  | 18.30  | 17.65  | 13.01      | 14.31  | 13.66  |
|                            | S <sub>2</sub> G <sub>2</sub> | 17.07  | 17.94  | 17.51  | 13.09      | 13.95  | 13.52  |
|                            | S <sub>2</sub> G <sub>3</sub> | 19.46  | 20.02  | 19.74  | 15.48      | 16.04  | 15.76  |
|                            | S <sub>2</sub> G <sub>4</sub> | 16.37  | 17.66  | 17.01  | 12.38      | 13.67  | 13.03  |
|                            | S <sub>2</sub> G <sub>5</sub> | 16.87  | 16.74  | 16.80  | 12.89      | 12.75  | 12.82  |
|                            | S <sub>3</sub> G <sub>1</sub> | 16.22  | 18.30  | 17.65  | 12.24      | 13.26  | 13.66  |
|                            | S <sub>3</sub> G <sub>2</sub> | 17.01  | 17.94  | 17.51  | 13.03      | 12.18  | 13.52  |
|                            | S <sub>3</sub> G <sub>3</sub> | 19.51  | 20.02  | 19.74  | 15.53      | 13.65  | 15.76  |
|                            | S <sub>3</sub> G <sub>4</sub> | 16.30  | 17.66  | 17.01  | 12.31      | 12.70  | 13.03  |
|                            | S <sub>3</sub> G <sub>5</sub> | 17.52  | 16.74  | 16.80  | 13.54      | 13.50  | 12.82  |
|                            | S.E±                          | 0.34   | 0.43   | 0.30   | 0.33       | 0.43   | 0.30   |
|                            | C.D at 5%                     | NS     | 1.24   | 0.89   | NS         | 1.24   | 0.87   |
|                            | General Mean                  | 17.75  | 17.88  | 17.66  | 13.46      | 13.89  | 13.68  |

Genotype 63 - DPLW61 X DPLW29, Genotype 84 - DPLW46 X DPLW61, Genotype 53 - DPLW15 X DPLW29, Genotype 83 - DPLW48 X DPLW51, Konkan wal-2 – Check

**Table 3. Mean Stem dry weight (g) of Lablab bean as influenced by the different treatments**

| Treatments                 |                               | 30DAS |       |        | 60DAS |       |        |
|----------------------------|-------------------------------|-------|-------|--------|-------|-------|--------|
|                            |                               | 2015  | 2016  | Pooled | 2015  | 2016  | Pooled |
| <b>Sowing time</b>         |                               |       |       |        |       |       |        |
| S <sub>1</sub>             | 05 <sup>th</sup> Nov.         | 0.462 | 0.702 | 0.517  | 2.689 | 3.604 | 3.146  |
| S <sub>2</sub>             | 15 <sup>th</sup> Nov.         | 0.330 | 0.572 | 0.516  | 4.463 | 3.476 | 3.970  |
| S <sub>3</sub>             | 25 <sup>th</sup> Nov.         | 0.327 | 0.386 | 0.356  | 4.369 | 3.418 | 3.894  |
|                            | S.E±                          | 0.01  | 0.03  | 0.01   | 0.28  | 0.12  | 0.17   |
|                            | C.D at 5%                     | 0.04  | 0.08  | 0.04   | 0.82  | 0.34  | 0.49   |
| <b>Genotypes</b>           |                               |       |       |        |       |       |        |
| G <sub>1</sub>             | Genotype 63                   | 0.40  | 0.54  | 0.49   | 3.82  | 3.30  | 3.91   |
| G <sub>2</sub>             | Genotype 84                   | 0.35  | 0.62  | 0.47   | 3.78  | 3.13  | 3.56   |
| G <sub>3</sub>             | Genotype 53                   | 0.42  | 0.62  | 0.50   | 4.69  | 4.82  | 4.30   |
| G <sub>4</sub>             | Genotype 83                   | 0.32  | 0.54  | 0.43   | 3.16  | 3.44  | 3.30   |
| G <sub>5</sub>             | Konkan Wal-2                  | 0.37  | 0.44  | 0.43   | 3.76  | 2.81  | 3.28   |
|                            | S.E±                          | 0.02  | 0.04  | 0.03   | 0.33  | 0.15  | 0.17   |
|                            | C.D at 5%                     | 0.07  | 0.12  | 0.08   | 0.97  | 0.43  | 0.50   |
| <b>Interaction effects</b> |                               |       |       |        |       |       |        |
|                            | S <sub>1</sub> G <sub>1</sub> | 0.62  | 0.33  | 0.48   | 3.45  | 3.30  | 3.37   |
|                            | S <sub>1</sub> G <sub>2</sub> | 0.52  | 0.86  | 0.69   | 4.03  | 3.50  | 3.76   |
|                            | S <sub>1</sub> G <sub>3</sub> | 0.25  | 0.87  | 0.56   | 2.23  | 5.21  | 3.72   |
|                            | S <sub>1</sub> G <sub>4</sub> | 0.30  | 0.40  | 0.35   | 0.96  | 2.97  | 1.96   |
|                            | S <sub>1</sub> G <sub>5</sub> | 0.61  | 0.40  | 0.51   | 2.78  | 3.05  | 2.91   |
|                            | S <sub>2</sub> G <sub>1</sub> | 0.31  | 0.71  | 0.51   | 3.82  | 3.45  | 3.64   |
|                            | S <sub>2</sub> G <sub>2</sub> | 0.29  | 0.68  | 0.49   | 5.09  | 2.65  | 3.87   |
|                            | S <sub>2</sub> G <sub>3</sub> | 0.42  | 0.61  | 0.51   | 4.75  | 4.97  | 4.86   |
|                            | S <sub>2</sub> G <sub>4</sub> | 0.33  | 0.81  | 0.57   | 4.25  | 3.62  | 3.94   |
|                            | S <sub>2</sub> G <sub>5</sub> | 0.30  | 0.69  | 0.49   | 4.40  | 2.70  | 3.55   |
|                            | S <sub>3</sub> G <sub>1</sub> | 0.27  | 0.56  | 0.42   | 4.18  | 3.15  | 3.66   |
|                            | S <sub>3</sub> G <sub>2</sub> | 0.25  | 0.33  | 0.29   | 4.96  | 3.24  | 4.10   |
|                            | S <sub>3</sub> G <sub>3</sub> | 0.45  | 0.38  | 0.42   | 4.36  | 4.29  | 4.32   |
|                            | S <sub>3</sub> G <sub>4</sub> | 0.32  | 0.41  | 0.36   | 4.26  | 3.74  | 4.00   |
|                            | S <sub>3</sub> G <sub>5</sub> | 0.34  | 0.24  | 0.29   | 4.09  | 2.67  | 3.38   |
|                            | S.E±                          | 0.04  | 0.07  | 0.06   | 0.58  | 0.25  | 0.30   |
|                            | C.D at 5%                     | 0.12  | 0.20  | 0.36   | NS    | 0.74  | 0.86   |
|                            | General Mean                  | 0.37  | 0.55  | 0.46   | 3.84  | 3.50  | 3.67   |

Genotype 63 - DPLW61 X DPLW29, Genotype 84 - DPLW46 X DPLW61, Genotype 53 - DPLW15 X DPLW29, Genotype 83 - DPLW48 X DPLW51, Konkan wal-2 – Check

Continued.....

| Treatments          |                               | 90 DAS |       |        | At-harvest |       |        |
|---------------------|-------------------------------|--------|-------|--------|------------|-------|--------|
|                     |                               | 2015   | 2016  | Pooled | 2015       | 2016  | Pooled |
| Sowing time         |                               |        |       |        |            |       |        |
| S <sub>1</sub>      | 05 <sup>th</sup> Nov.         | 4.619  | 4.762 | 4.658  | 4.985      | 5.277 | 5.099  |
| S <sub>2</sub>      | 15 <sup>th</sup> Nov.         | 3.717  | 4.762 | 4.240  | 4.083      | 5.212 | 4.680  |
| S <sub>3</sub>      | 25 <sup>th</sup> Nov.         | 4.030  | 4.137 | 4.084  | 4.396      | 4.652 | 4.524  |
|                     | S.E±                          | 0.26   | 0.16  | 0.17   | 0.26       | 0.16  | 0.17   |
|                     | C.D at 5%                     | 0.76   | 0.47  | 0.49   | 0.76       | 0.47  | 0.49   |
| Genotypes           |                               |        |       |        |            |       |        |
| G <sub>1</sub>      | Genotype 63                   | 4.11   | 4.53  | 4.32   | 4.47       | 5.04  | 4.76   |
| G <sub>2</sub>      | Genotype 84                   | 4.09   | 4.15  | 4.12   | 4.46       | 4.66  | 4.56   |
| G <sub>3</sub>      | Genotype 53                   | 5.05   | 5.75  | 5.40   | 5.42       | 6.26  | 5.84   |
| G <sub>4</sub>      | Genotype 83                   | 3.74   | 4.11  | 3.93   | 4.11       | 4.62  | 4.37   |
| G <sub>5</sub>      | Konkan Wal-2                  | 3.62   | 4.13  | 3.88   | 3.99       | 4.65  | 4.32   |
|                     | S.E±                          | 0.15   | 0.15  | 0.09   | 0.14       | 0.14  | 0.09   |
|                     | C.D at 5%                     | 0.44   | 0.42  | 0.27   | 0.41       | 0.42  | 0.27   |
| Interaction effects |                               |        |       |        |            |       |        |
|                     | S <sub>1</sub> G <sub>1</sub> | 5.00   | 4.39  | 4.70   | 16.69      | 17.05 | 16.87  |
|                     | S <sub>1</sub> G <sub>2</sub> | 4.46   | 4.29  | 4.37   | 18.12      | 17.76 | 17.94  |
|                     | S <sub>1</sub> G <sub>3</sub> | 5.23   | 6.68  | 5.92   | 19.46      | 20.80 | 20.06  |
|                     | S <sub>1</sub> G <sub>4</sub> | 4.52   | 4.12  | 4.32   | 17.13      | 19.22 | 18.18  |
|                     | S <sub>1</sub> G <sub>5</sub> | 3.88   | 4.34  | 4.11   | 17.13      | 17.46 | 17.29  |
|                     | S <sub>2</sub> G <sub>1</sub> | 3.60   | 4.23  | 3.92   | 16.99      | 18.30 | 17.65  |
|                     | S <sub>2</sub> G <sub>2</sub> | 3.24   | 4.54  | 3.89   | 17.07      | 17.94 | 17.51  |
|                     | S <sub>2</sub> G <sub>3</sub> | 5.17   | 6.34  | 5.78   | 19.33      | 20.02 | 19.74  |
|                     | S <sub>2</sub> G <sub>4</sub> | 3.12   | 4.74  | 3.93   | 16.37      | 17.66 | 17.01  |
|                     | S <sub>2</sub> G <sub>5</sub> | 3.45   | 3.63  | 3.54   | 16.87      | 16.74 | 16.80  |
|                     | S <sub>3</sub> G <sub>1</sub> | 3.71   | 4.96  | 4.33   | 16.22      | 17.25 | 16.73  |
|                     | S <sub>3</sub> G <sub>2</sub> | 4.58   | 3.61  | 4.09   | 17.01      | 16.17 | 16.59  |
|                     | S <sub>3</sub> G <sub>3</sub> | 4.75   | 4.23  | 4.49   | 19.51      | 17.64 | 18.58  |
|                     | S <sub>3</sub> G <sub>4</sub> | 3.59   | 3.47  | 3.53   | 16.30      | 16.68 | 16.49  |
|                     | S <sub>3</sub> G <sub>5</sub> | 3.52   | 4.42  | 3.97   | 17.52      | 17.49 | 17.51  |
|                     | S.E±                          | 0.22   | 0.23  | 0.16   | 0.24       | 0.25  | 0.16   |
|                     | C.D at 5%                     | 0.68   | 0.71  | 0.48   | 0.70       | 0.72  | 0.48   |
|                     | General Mean                  | 4.12   | 4.53  | 4.33   | 4.49       | 5.05  | 4.47   |

Genotype 63 - DPLW61 X DPLW29, Genotype 84 - DPLW46 X DPLW61, Genotype 53 - DPLW15 X DPLW29, Genotype 83 - DPLW48 X DPLW51, Konkan wal-2 – Check

**Table 4. Mean Total dry weight (g/plant) of Lablab bean as influenced by the different treatments**

| Treatments          |                               | 30 DAS |       |        | 60 DAS |        |        |
|---------------------|-------------------------------|--------|-------|--------|--------|--------|--------|
|                     |                               | 2015   | 2016  | Pooled | 2015   | 2016   | Pooled |
| Sowing time         |                               |        |       |        |        |        |        |
| S <sub>1</sub>      | 05 <sup>th</sup> Nov.         | 2.073  | 2.362 | 2.085  | 11.256 | 11.823 | 11.539 |
| S <sub>2</sub>      | 15 <sup>th</sup> Nov.         | 1.559  | 2.098 | 1.960  | 10.365 | 10.572 | 10.468 |
| S <sub>3</sub>      | 25 <sup>th</sup> Nov.         | 1.722  | 1.781 | 1.752  | 10.653 | 11.229 | 10.941 |
|                     | S.E±                          | 0.08   | 0.05  | 0.04   | 0.43   | 0.18   | 0.23   |
|                     | C.D at 5%                     | 0.25   | 0.14  | 0.12   | 1.25   | 0.52   | 0.68   |
| Genotypes           |                               |        |       |        |        |        |        |
| G <sub>1</sub>      | Genotype 63                   | 2.01   | 1.63  | 1.82   | 12.08  | 10.93  | 11.50  |
| G <sub>2</sub>      | Genotype 84                   | 1.61   | 2.17  | 1.89   | 14.89  | 10.93  | 12.91  |
| G <sub>3</sub>      | Genotype 53                   | 2.01   | 2.49  | 2.21   | 15.03  | 14.85  | 14.94  |
| G <sub>4</sub>      | Genotype 83                   | 1.67   | 2.11  | 1.89   | 11.51  | 11.88  | 11.70  |
| G <sub>5</sub>      | Konkan Wal-2                  | 1.93   | 1.73  | 1.83   | 13.61  | 10.78  | 12.20  |
|                     | S.E±                          | 0.06   | 0.09  | 0.05   | 0.52   | 0.29   | 0.29   |
|                     | C.D at 5%                     | 0.17   | 0.26  | 0.15   | 1.52   | 0.89   | 0.85   |
| Interaction effects |                               |        |       |        |        |        |        |
|                     | S <sub>1</sub> G <sub>1</sub> | 2.58   | 1.59  | 2.09   | 11.75  | 11.25  | 11.50  |
|                     | S <sub>1</sub> G <sub>2</sub> | 1.95   | 2.29  | 2.12   | 13.36  | 11.49  | 12.42  |
|                     | S <sub>1</sub> G <sub>3</sub> | 2.20   | 2.75  | 2.47   | 9.29   | 15.07  | 12.18  |
|                     | S <sub>1</sub> G <sub>4</sub> | 1.68   | 1.94  | 1.81   | 8.50   | 10.58  | 9.54   |
|                     | S <sub>1</sub> G <sub>5</sub> | 1.97   | 1.92  | 1.94   | 13.38  | 10.73  | 12.06  |
|                     | S <sub>2</sub> G <sub>1</sub> | 1.70   | 2.55  | 2.13   | 12.36  | 10.90  | 11.63  |
|                     | S <sub>2</sub> G <sub>2</sub> | 1.32   | 2.65  | 1.99   | 16.96  | 10.08  | 13.52  |
|                     | S <sub>2</sub> G <sub>3</sub> | 1.71   | 2.55  | 2.13   | 18.55  | 14.68  | 16.62  |
|                     | S <sub>2</sub> G <sub>4</sub> | 1.50   | 2.11  | 1.81   | 13.28  | 12.09  | 12.69  |
|                     | S <sub>2</sub> G <sub>5</sub> | 1.55   | 1.96  | 1.76   | 15.67  | 10.10  | 12.89  |
|                     | S <sub>3</sub> G <sub>1</sub> | 1.74   | 1.61  | 1.68   | 12.13  | 10.64  | 11.38  |
|                     | S <sub>3</sub> G <sub>2</sub> | 1.57   | 1.57  | 1.57   | 14.34  | 11.22  | 12.78  |
|                     | S <sub>3</sub> G <sub>3</sub> | 1.89   | 2.16  | 2.03   | 17.26  | 14.81  | 16.03  |
|                     | S <sub>3</sub> G <sub>4</sub> | 1.83   | 2.27  | 2.05   | 12.76  | 12.97  | 12.86  |
|                     | S <sub>3</sub> G <sub>5</sub> | 1.58   | 1.30  | 1.44   | 11.78  | 11.51  | 11.65  |
|                     | S.E±                          | 0.16   | 0.11  | 0.09   | 0.90   | 0.51   | 0.51   |
|                     | C.D at 5%                     | NS     | 0.32  | 0.26   | 2.64   | 1.48   | 1.48   |
|                     | General Mean                  | 2.08   | 1.78  | 1.93   | 13.42  | 11.87  | 12.62  |

Genotype 63 - DPLW61 X DPLW29, Genotype 84 - DPLW46 X DPLW61, Genotype 53 - DPLW15 X DPLW29, Genotype 83 - DPLW48 X DPLW51, Konkan wal-2 – Check

Continued.....

| Treatments          |                               | 90 DAS |        |        | At harvest |        |        |
|---------------------|-------------------------------|--------|--------|--------|------------|--------|--------|
|                     |                               | 2015   | 2016   | Pooled | 2015       | 2016   | Pooled |
| Sowing time         |                               |        |        |        |            |        |        |
| S <sub>1</sub>      | 05 <sup>th</sup> Nov.         | 22.665 | 23.667 | 23.166 | 18.314     | 19.167 | 18.740 |
| S <sub>2</sub>      | 15 <sup>th</sup> Nov.         | 21.437 | 23.408 | 22.423 | 17.086     | 18.908 | 17.997 |
| S <sub>3</sub>      | 25 <sup>th</sup> Nov.         | 21.709 | 21.697 | 21.703 | 17.358     | 17.197 | 17.278 |
|                     | S.E±                          | 0.37   | 0.21   | 0.23   | 0.37       | 0.21   | 0.23   |
|                     | C.D at 5%                     | 1.08   | 0.63   | 0.66   | 1.08       | 0.63   | 0.66   |
| Genotypes           |                               |        |        |        |            |        |        |
| G <sub>1</sub>      | Genotype 63                   | 21.10  | 22.57  | 21.84  | 16.75      | 18.07  | 17.41  |
| G <sub>2</sub>      | Genotype 84                   | 21.86  | 21.95  | 21.90  | 17.51      | 17.45  | 17.48  |
| G <sub>3</sub>      | Genotype 53                   | 24.85  | 25.75  | 25.30  | 20.50      | 21.25  | 20.88  |
| G <sub>4</sub>      | Genotype 83                   | 20.71  | 22.48  | 21.59  | 16.36      | 17.98  | 17.17  |
| G <sub>5</sub>      | Konkan Wal-2                  | 21.16  | 21.87  | 21.52  | 16.81      | 17.37  | 17.09  |
|                     | S.E±                          | 0.21   | 0.30   | 0.20   | 0.24       | 0.30   | 0.20   |
|                     | C.D at 5%                     | 0.70   | 0.89   | 0.59   | 0.70       | 0.89   | 0.59   |
| Interaction effects |                               |        |        |        |            |        |        |
|                     | S <sub>1</sub> G <sub>1</sub> | 22.06  | 21.95  | 22.00  | 17.70      | 17.45  | 17.58  |
|                     | S <sub>1</sub> G <sub>2</sub> | 22.94  | 22.56  | 22.75  | 18.59      | 18.06  | 18.33  |
|                     | S <sub>1</sub> G <sub>3</sub> | 25.00  | 27.22  | 26.11  | 20.57      | 23.15  | 21.86  |
|                     | S <sub>1</sub> G <sub>4</sub> | 22.02  | 23.85  | 22.94  | 17.67      | 19.35  | 18.51  |
|                     | S <sub>1</sub> G <sub>5</sub> | 21.38  | 22.32  | 21.85  | 17.03      | 17.82  | 17.42  |
|                     | S <sub>2</sub> G <sub>1</sub> | 20.96  | 23.05  | 22.00  | 16.61      | 18.55  | 17.58  |
|                     | S <sub>2</sub> G <sub>2</sub> | 20.68  | 22.99  | 21.84  | 16.33      | 18.49  | 17.41  |
|                     | S <sub>2</sub> G <sub>3</sub> | 24.92  | 27.65  | 26.94  | 20.65      | 22.72  | 21.68  |
|                     | S <sub>2</sub> G <sub>4</sub> | 19.85  | 22.91  | 21.38  | 15.50      | 18.41  | 16.95  |
|                     | S <sub>2</sub> G <sub>5</sub> | 20.69  | 20.88  | 20.78  | 16.34      | 16.38  | 16.36  |
|                     | S <sub>3</sub> G <sub>1</sub> | 20.30  | 22.72  | 21.51  | 15.95      | 18.22  | 17.08  |
|                     | S <sub>3</sub> G <sub>2</sub> | 21.95  | 20.29  | 21.12  | 17.60      | 15.79  | 16.70  |
|                     | S <sub>3</sub> G <sub>3</sub> | 24.63  | 22.38  | 23.51  | 20.28      | 17.88  | 19.08  |
|                     | S <sub>3</sub> G <sub>4</sub> | 20.25  | 20.67  | 20.46  | 15.90      | 16.17  | 16.03  |
|                     | S <sub>3</sub> G <sub>5</sub> | 21.41  | 22.43  | 21.92  | 17.06      | 17.93  | 17.49  |
|                     | S.E±                          | 0.42   | 0.53   | 0.35   | 0.42       | 0.53   | 0.35   |
|                     | C.D at 5%                     | 1.22   | 1.54   | 1.02   | 1.22       | 1.54   | 1.02   |
|                     | General Mean                  | 21.94  | 22.92  | 21.43  | 17.49      | 18.42  | 18.00  |

Genotype 63 - DPLW61 X DPLW29, Genotype 84 - DPLW46 X DPLW61, Genotype 53 - DPLW15 X DPLW29, Genotype 83 - DPLW48 X DPLW51, Konkan wal-2 – Check

**Table 5. Mean Absolute growth rate (g/day/plant) of Lablab bean as influenced by the different treatments**

| Treatments          |                               | 30-60 DAS |        |        | 60-90 DAS |        |        | 90-at harvest DAS |        |        |
|---------------------|-------------------------------|-----------|--------|--------|-----------|--------|--------|-------------------|--------|--------|
|                     |                               | 2015      | 2016   | Pooled | 2015      | 2016   | Pooled | 2015              | 2016   | Pooled |
| Sowing time         |                               |           |        |        |           |        |        |                   |        |        |
| S <sub>1</sub>      | 05 <sup>th</sup> Nov.         | 0.3532    | 0.2934 | 0.3180 | 0.1839    | 0.1440 | 0.1639 | 0.0993            | 0.0918 | 0.0956 |
| S <sub>2</sub>      | 15 <sup>th</sup> Nov.         | 0.3291    | 0.2829 | 0.3060 | 0.1103    | 0.0917 | 0.1010 | 0.0630            | 0.0836 | 0.0733 |
| S <sub>3</sub>      | 25 <sup>th</sup> Nov.         | 0.3057    | 0.2760 | 0.2908 | 0.0978    | 0.0853 | 0.0915 | 0.0549            | 0.0793 | 0.0671 |
|                     | S.E±                          | 0.0148    | 0.0091 | 0.0095 | 0.0111    | 0.0134 | 0.0066 | 0.0063            | 0.0091 | 0.0050 |
|                     | C.D at 5%                     | NS        | NS     | NS     | 0.0325    | 0.0392 | 0.0192 | 0.0185            | NS     | 0.0147 |
| Genotypes           |                               |           |        |        |           |        |        |                   |        |        |
| G <sub>1</sub>      | Genotype 63                   | 0.3476    | 0.3265 | 0.3370 | 0.1273    | 0.0446 | 0.0599 | 0.0721            | 0.1078 | 0.0899 |
| G <sub>2</sub>      | Genotype 84                   | 0.2867    | 0.2484 | 0.2675 | 0.1570    | 0.1069 | 0.1319 | 0.0673            | 0.0575 | 0.0624 |
| G <sub>3</sub>      | Genotype 53                   | 0.3654    | 0.3589 | 0.3592 | 0.1665    | 0.1640 | 0.1653 | 0.1175            | 0.1162 | 0.1155 |
| G <sub>4</sub>      | Genotype 83                   | 0.3024    | 0.2601 | 0.2813 | 0.0485    | 0.1272 | 0.0588 | 0.0600            | 0.0857 | 0.0728 |
| G <sub>5</sub>      | Konkan Wal-2                  | 0.3396    | 0.2865 | 0.3259 | 0.1141    | 0.0923 | 0.1032 | 0.0451            | 0.0574 | 0.0513 |
|                     | S.E±                          | 0.0174    | 0.0177 | 0.0150 | 0.0192    | 0.0216 | 0.0162 | 0.0121            | 0.0142 | 0.0098 |
|                     | C.D at 5%                     | 0.0508    | 0.0516 | 0.0438 | 0.0560    | 0.0631 | 0.0472 | NS                | 0.0416 | 0.0287 |
| Interaction effects |                               |           |        |        |           |        |        |                   |        |        |
|                     | S <sub>1</sub> G <sub>1</sub> | 0.3685    | 0.3674 | 0.3679 | 0.0428    | 0.0204 | 0.0316 | 0.0985            | 0.0695 | 0.0840 |
|                     | S <sub>1</sub> G <sub>2</sub> | 0.2688    | 0.2327 | 0.2507 | 0.1834    | 0.1087 | 0.1461 | 0.0688            | 0.0614 | 0.0651 |
|                     | S <sub>1</sub> G <sub>3</sub> | 0.4148    | 0.3339 | 0.3743 | 0.3303    | 0.3081 | 0.3146 | 0.1406            | 0.1713 | 0.0570 |
|                     | S <sub>1</sub> G <sub>4</sub> | 0.2293    | 0.2425 | 0.2359 | 0.3211    | 0.1709 | 0.2506 | 0.0342            | 0.0616 | 0.1223 |
|                     | S <sub>1</sub> G <sub>5</sub> | 0.4109    | 0.3086 | 0.3597 | 0.4191    | 0.1118 | 0.2769 | 0.0608            | 0.0329 | 0.0469 |
|                     | S <sub>2</sub> G <sub>1</sub> | 0.3598    | 0.3238 | 0.3418 | 0.0388    | 0.0461 | 0.0425 | 0.0525            | 0.1040 | 0.0570 |
|                     | S <sub>2</sub> G <sub>2</sub> | 0.2753    | 0.2252 | 0.2503 | 0.1856    | 0.1256 | 0.1556 | 0.1017            | 0.0723 | 0.0807 |
|                     | S <sub>2</sub> G <sub>3</sub> | 0.3678    | 0.3340 | 0.3509 | 0.1225    | 0.1104 | 0.1165 | 0.0393            | 0.1279 | 0.1106 |
|                     | S <sub>2</sub> G <sub>4</sub> | 0.3688    | 0.2486 | 0.3087 | 0.0511    | 0.1134 | 0.0822 | 0.1269            | 0.0942 | 0.1105 |
|                     | S <sub>2</sub> G <sub>5</sub> | 0.3940    | 0.2828 | 0.3384 | 0.0912    | 0.0628 | 0.0770 | 0.0341            | 0.0607 | 0.0474 |
|                     | S <sub>3</sub> G <sub>1</sub> | 0.3144    | 0.2884 | 0.3014 | 0.0639    | 0.0673 | 0.0656 | 0.1135            | 0.1501 | 0.1318 |
|                     | S <sub>3</sub> G <sub>2</sub> | 0.3159    | 0.2872 | 0.3016 | 0.0520    | 0.0862 | 0.0941 | 0.0314            | 0.0388 | 0.0351 |
|                     | S <sub>3</sub> G <sub>3</sub> | 0.2361    | 0.2288 | 0.2324 | 0.0600    | 0.0735 | 0.0648 | 0.0342            | 0.0675 | 0.0309 |
|                     | S <sub>3</sub> G <sub>4</sub> | 0.2893    | 0.2893 | 0.2893 | 0.1204    | 0.0972 | 0.1088 | 0.0551            | 0.0832 | 0.0691 |
|                     | S <sub>3</sub> G <sub>5</sub> | 0.2912    | 0.2681 | 0.2797 | 0.2091    | 0.1024 | 0.1558 | 0.0405            | 0.0786 | 0.0596 |
|                     | S.E±                          | 0.0302    | 0.0306 | 0.0260 | 0.0321    | 0.0374 | 0.0280 | 0.0210            | 0.0247 | 0.0170 |
|                     | C.D at 5%                     | 0.0880    | NS     | 0.0759 | 0.0969    | 0.1092 | 0.0818 | NS                | 0.0720 | NS     |
| General Mean        |                               |           |        |        |           |        |        |                   |        |        |
|                     |                               | 0.3283    | 0.2841 | 0.3067 | 0.1307    | 0.1070 | 0.1188 | 0.0774            | 0.0840 | 0.0785 |

Genotype 63 - DPLW61 X DPLW29, Genotype 84 - DPLW46 X DPLW61, Genotype 53 - DPLW15 X DPLW29, Genotype 83 - DPLW48 X DPLW51, Konkan wal-2 – Check

**Table 6. Mean Relative growth rate (g/g/day) of Lablab bean as influenced by the different treatments**

| Treatments                           | 30-60 DAS |        |        | 60-90 DAS |        |        | 90-At harvest DAS |         |         |
|--------------------------------------|-----------|--------|--------|-----------|--------|--------|-------------------|---------|---------|
|                                      | 2015      | 2016   | Pooled | 2015      | 2016   | Pooled | 2015              | 2016    | Pooled  |
| <b>Sowing time</b>                   |           |        |        |           |        |        |                   |         |         |
| S <sub>1</sub> 05 <sup>th</sup> Nov. | 0.0297    | 0.0299 | 0.0295 | 0.0061    | 0.0055 | 0.0058 | 0.0026            | 0.0028  | 0.0027  |
| S <sub>2</sub> 15 <sup>th</sup> Nov. | 0.0244    | 0.0282 | 0.0263 | 0.0034    | 0.0038 | 0.0035 | 0.0016            | 0.0023  | 0.0026  |
| S <sub>3</sub> 25 <sup>th</sup> Nov. | 0.0279    | 0.0292 | 0.0289 | 0.0039    | 0.0034 | 0.0036 | 0.0016            | 0.0026  | 0.0021  |
| S.E±                                 | 0.0009    | 0.0006 | 0.0004 | 0.0005    | 0.0005 | 0.0002 | 0.0001            | 0.0002  | 0.0001  |
| C.D at 5%                            | 0.0026    | NS     | 0.0012 | 0.0016    | 0.0014 | 0.0006 | 0.0004            | NS      | 0.0004  |
| <b>Genotypes</b>                     |           |        |        |           |        |        |                   |         |         |
| G <sub>1</sub> Genotype 63           | 0.0266    | 0.0299 | 0.0282 | 0.0016    | 0.0018 | 0.0017 | 0.0031            | 0.0032  | 0.0032  |
| G <sub>2</sub> Genotype 84           | 0.0265    | 0.0276 | 0.0270 | 0.0056    | 0.0048 | 0.0054 | 0.0017            | 0.0019  | 0.0018  |
| G <sub>3</sub> Genotype 53           | 0.0295    | 0.0314 | 0.0305 | 0.0057    | 0.0058 | 0.0055 | 0.0032            | 0.0035  | 0.0033  |
| G <sub>4</sub> Genotype 83           | 0.0266    | 0.0284 | 0.0275 | 0.0052    | 0.0050 | 0.0053 | 0.0019            | 0.0034  | 0.0027  |
| G <sub>5</sub> Konkan Wal-2          | 0.0275    | 0.0283 | 0.0279 | 0.0038    | 0.0037 | 0.0037 | 0.0011            | 0.0019  | 0.0015  |
| S.E±                                 | 0.0008    | 0.0012 | 0.0007 | 0.0007    | 0.0009 | 0.0007 | 0.0003            | 0.0005  | 0.0003  |
| C.D at 5%                            | 0.0023    | NS     | NS     | 0.0021    | 0.0027 | 0.0020 | 0.0009            | NS      | 0.0009  |
| <b>Interaction effects</b>           |           |        |        |           |        |        |                   |         |         |
| S <sub>1</sub> G <sub>1</sub>        | 0.0235    | 0.0303 | 0.0269 | 0.0013    | 0.0007 | 0.0010 | 0.0026            | 0.0022  | 0.0024  |
| S <sub>1</sub> G <sub>2</sub>        | 0.0238    | 0.0264 | 0.0251 | 0.0064    | 0.0049 | 0.0057 | 0.0018            | 0.0021  | 0.0020  |
| S <sub>1</sub> G <sub>3</sub>        | 0.0314    | 0.0327 | 0.0318 | 0.0111    | 0.0113 | 0.0112 | 0.0038            | 0.0049  | 0.0042  |
| S <sub>1</sub> G <sub>4</sub>        | 0.0237    | 0.0273 | 0.0255 | 0.0104    | 0.0066 | 0.0089 | 0.0028            | 0.0015  | 0.0024  |
| S <sub>1</sub> G <sub>5</sub>        | 0.0300    | 0.0278 | 0.0289 | 0.0012    | 0.0043 | 0.0027 | 0.0016            | 0.0010  | 0.0013  |
| S <sub>2</sub> G <sub>1</sub>        | 0.0289    | 0.0301 | 0.0295 | 0.0013    | 0.0021 | 0.0017 | 0.0038            | 0.0029  | 0.0033  |
| S <sub>2</sub> G <sub>2</sub>        | 0.0272    | 0.0273 | 0.0272 | 0.0072    | 0.0061 | 0.0066 | 0.0026            | 0.0024  | 0.0025  |
| S <sub>2</sub> G <sub>3</sub>        | 0.0209    | 0.0322 | 0.0302 | 0.0037    | 0.0037 | 0.0037 | 0.0024            | 0.0035  | 0.0029  |
| S <sub>2</sub> G <sub>4</sub>        | 0.0299    | 0.0286 | 0.0292 | 0.0018    | 0.0047 | 0.0032 | 0.0035            | 0.0032  | 0.0033  |
| S <sub>2</sub> G <sub>5</sub>        | 0.0310    | 0.0280 | 0.0295 | 0.0029    | 0.0026 | 0.0027 | 0.0009            | 0.0021  | 0.0015  |
| S <sub>3</sub> G <sub>1</sub>        | 0.0272    | 0.0293 | 0.0283 | 0.0023    | 0.0027 | 0.0025 | 0.0033            | 0.0046  | 0.0040  |
| S <sub>3</sub> G <sub>2</sub>        | 0.0284    | 0.0291 | 0.0288 | 0.0044    | 0.0036 | 0.0040 | 0.0009            | 0.0013  | 0.0011  |
| S <sub>3</sub> G <sub>3</sub>        | 0.0302    | 0.0316 | 0.0314 | 0.0014    | 0.0026 | 0.0020 | 0.0013            | 0.0021  | 0.0017  |
| S <sub>3</sub> G <sub>4</sub>        | 0.0262    | 0.0294 | 0.0278 | 0.0042    | 0.0039 | 0.0041 | 0.0015            | 0.0025  | 0.0020  |
| S <sub>3</sub> G <sub>5</sub>        | 0.0276    | 0.0291 | 0.0284 | 0.0073    | 0.0045 | 0.0059 | 0.0010            | 0.0026  | 0.0018  |
| S.E±                                 | 0.0014    | 0.0020 | 0.0013 | 0.0012    | 0.0016 | 0.0012 | 0.0005            | 0.0008  | 0.0006  |
| C.D at 5%                            | 0.0040    | NS     | NS     | 0.0036    | NS     | 0.0035 | NS                | NS      | NS      |
| General Mean                         | 0.0273    | 0.0291 | 0.0282 | 0.0045    | 0.0045 | 0.0044 | 0.00195           | 0.00259 | 0.00227 |

Genotype 63 - DPLW61 X DPLW29, Genotype 84 - DPLW46 X DPLW61, Genotype 53 - DPLW15 X DPLW29, Genotype 83 - DPLW48 X DPLW51, Konkan wal-2 – Check

**Table 12. Mean Net assimilation rate (g/dm<sup>2</sup>/day) of Lablab bean as influenced by the different treatments**

| Treatments                           | 30-60 DAS |           |          | 60-90 DAS |          |          | 90-At harvest DAS |          |          |
|--------------------------------------|-----------|-----------|----------|-----------|----------|----------|-------------------|----------|----------|
|                                      | 2015      | 2016      | Pooled   | 2015      | 2016     | Pooled   | 2015              | 2016     | Pooled   |
| <b>Sowing time</b>                   |           |           |          |           |          |          |                   |          |          |
| S <sub>1</sub> 05 <sup>th</sup> Nov. | 0.000123  | 0.000101  | 0.000111 | 0.000207  | 0.000136 | 0.000171 | 0.003553          | 0.003568 | 0.003535 |
| S <sub>2</sub> 15 <sup>th</sup> Nov. | 0.000112  | 0.000098  | 0.000104 | 0.000155  | 0.000136 | 0.000145 | 0.003440          | 0.003518 | 0.003504 |
| S <sub>3</sub> 25 <sup>th</sup> Nov. | 0.000115  | 0.000096  | 0.000108 | 0.000166  | 0.000134 | 0.000150 | 0.003061          | 0.003107 | 0.003084 |
| S.E±                                 | 0.000004  | 0.000003  | 0.000002 | 0.000008  | 0.000007 | 0.000004 | 0.000058          | 0.000109 | 0.000053 |
| C.D at 5%                            | NS        | NS        | NS       | 0.000023  | NS       | 0.000012 | 0.000169          | 0.000317 | 0.000155 |
| <b>Genotypes</b>                     |           |           |          |           |          |          |                   |          |          |
| G <sub>1</sub> Genotype 63           | 0.000125  | 0.000101  | 0.000119 | 0.000180  | 0.000145 | 0.000158 | 0.003447          | 0.003551 | 0.003499 |
| G <sub>2</sub> Genotype 84           | 0.000110  | 0.0000908 | 0.000101 | 0.000169  | 0.000128 | 0.000148 | 0.003029          | 0.003295 | 0.003162 |
| G <sub>3</sub> Genotype 53           | 0.000127  | 0.0001124 | 0.000125 | 0.000204  | 0.000154 | 0.000174 | 0.003875          | 0.003846 | 0.003860 |
| G <sub>4</sub> Genotype 83           | 0.000102  | 0.0000874 | 0.000095 | 0.000162  | 0.000121 | 0.000141 | 0.002815          | 0.002551 | 0.002683 |
| G <sub>5</sub> Konkan Wal-2          | 0.000120  | 0.0001008 | 0.000110 | 0.000164  | 0.000129 | 0.000147 | 0.003591          | 0.003747 | 0.003669 |
| S.E±                                 | 0.000005  | 0.000005  | 0.000004 | 0.000008  | 0.000010 | 0.000007 | 0.000094          | 0.000189 | 0.000114 |
| C.D at 5%                            | 0.000015  | 0.000016  | 0.000012 | 0.000022  | NS       | 0.000020 | 0.000274          | 0.000552 | 0.000334 |
| <b>Interaction effects</b>           |           |           |          |           |          |          |                   |          |          |
| S <sub>1</sub> G <sub>1</sub>        | 0.000138  | 0.000079  | 0.000112 | 0.000221  | 0.000155 | 0.000202 | 0.002950          | 0.002524 | 0.002737 |
| S <sub>1</sub> G <sub>2</sub>        | 0.000100  | 0.000083  | 0.000092 | 0.000195  | 0.000135 | 0.000165 | 0.004084          | 0.003734 | 0.003909 |
| S <sub>1</sub> G <sub>3</sub>        | 0.000144  | 0.000126  | 0.000132 | 0.000270  | 0.000157 | 0.000220 | 0.004088          | 0.004420 | 0.004191 |
| S <sub>1</sub> G <sub>4</sub>        | 0.000086  | 0.000086  | 0.000086 | 0.000169  | 0.000129 | 0.000149 | 0.002471          | 0.003288 | 0.002879 |
| S <sub>1</sub> G <sub>5</sub>        | 0.000093  | 0.000108  | 0.000126 | 0.000179  | 0.000106 | 0.000168 | 0.003731          | 0.003875 | 0.003803 |
| S <sub>2</sub> G <sub>1</sub>        | 0.000125  | 0.000111  | 0.000118 | 0.000170  | 0.000139 | 0.000154 | 0.002578          | 0.002439 | 0.002508 |
| S <sub>2</sub> G <sub>2</sub>        | 0.000097  | 0.000079  | 0.000088 | 0.000146  | 0.000117 | 0.000132 | 0.003364          | 0.003460 | 0.003412 |
| S <sub>2</sub> G <sub>3</sub>        | 0.000125  | 0.000112  | 0.000118 | 0.000142  | 0.000121 | 0.000132 | 0.003961          | 0.004014 | 0.004051 |
| S <sub>2</sub> G <sub>4</sub>        | 0.000134  | 0.000087  | 0.000110 | 0.000160  | 0.000120 | 0.000140 | 0.004012          | 0.003883 | 0.003948 |
| S <sub>2</sub> G <sub>5</sub>        | 0.000134  | 0.000101  | 0.000118 | 0.000157  | 0.000181 | 0.000169 | 0.003722          | 0.003793 | 0.003758 |
| S <sub>3</sub> G <sub>1</sub>        | 0.000112  | 0.000101  | 0.000106 | 0.000172  | 0.000140 | 0.000156 | 0.002916          | 0.002689 | 0.002802 |
| S <sub>3</sub> G <sub>2</sub>        | 0.000110  | 0.000100  | 0.000105 | 0.000152  | 0.000135 | 0.000143 | 0.002893          | 0.003458 | 0.003175 |
| S <sub>3</sub> G <sub>3</sub>        | 0.000142  | 0.000112  | 0.000127 | 0.000178  | 0.000137 | 0.000158 | 0.003574          | 0.003102 | 0.003338 |
| S <sub>3</sub> G <sub>4</sub>        | 0.000111  | 0.000100  | 0.000105 | 0.000180  | 0.000134 | 0.000157 | 0.002605          | 0.002713 | 0.002659 |
| S <sub>3</sub> G <sub>5</sub>        | 0.000102  | 0.000093  | 0.000098 | 0.000150  | 0.000125 | 0.000137 | 0.003318          | 0.003571 | 0.003445 |
| S.E±                                 | 0.000009  | 0.0000094 | 0.000007 | 0.000013  | 0.000017 | 0.000012 | 0.000162          | 0.000328 | 0.000198 |
| C.D at 5%                            | 0.000027  | NS        | 0.000021 | 0.000038  | NS       | NS       | 0.000474          | NS       | 0.000578 |
| General Mean                         | 0.000115  | 0.000118  | 0.000105 | 0.000169  | 0.000135 | 0.000151 | 0.003485          | 0.003398 | 0.003547 |

Genotype 63 - DPLW61 X DPLW29, Genotype 84 - DPLW46 X DPLW61, Genotype 53 - DPLW15 X DPLW29, Genotype 83 - DPLW48 X DPLW51, Konkan wal-2 – Check



## हवामान बदलाचा दक्षिण महाराष्ट्रातील कृषी क्षेत्रावर परिणाम : एक चिकित्सक अभ्यास

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### सारांश

दक्षिण महाराष्ट्रातील हवामान बदलाचा कृषी आणि दुग्ध व्यवसायावर होणारा परिणाम हा अभ्यासाचा मुख्य विषय आहे. या संशोधनातून असे दिसून आले की तापमानातील वाढ, अनियमित पाऊस, दुष्काळ, पूर, आणि अवकाळी पावसामुळे शेतीच्या उत्पादनावर आणि पशुधनावर विपरीत परिणाम होत आहे. वाढत्या तापमानामुळे पिकांच्या वाढीवर परिणाम होतो, उत्पादन घटते आणि शेतकऱ्यांच्या आर्थिक स्थितीवर मोठा ताण येतो. त्याचप्रमाणे, चारा टंचाई, पाणी उपलब्धतेची समस्या आणि पशुधनाच्या आरोग्यावर होणारा विपरीत परिणाम यामुळे दुग्ध व्यवसायही संकटात सापडतो. हवामान बदलामुळे केवळ पीक उत्पादन आणि दुग्ध व्यवसायावरच परिणाम होत नाही, तर शेतकऱ्यांच्या एकूण आर्थिक आणि सामाजिक परिस्थितीवरही त्याचा दूरगामी प्रभाव दिसून येतो. त्यामुळे भविष्यात हवामान बदलाचा धोका कमी करण्यासाठी कृषी संशोधन, हवामान अनुकूल पीकपद्धती, जलसंधारण, सेंद्रिय शेती, सुधारित बियाण्यांचा वापर, आणि आधुनिक तंत्रज्ञानाचा अवलंब यावर भर देणे आवश्यक आहे. दुग्ध व्यवसाय टिकवून ठेवण्यासाठी जनावरांना उष्णतेपासून संरक्षण, चारा निर्मिती योजना, आणि योग्य आरोग्य व्यवस्थापन अत्यंत गरजेचे आहे. या संशोधनातून मिळालेल्या निष्कर्षावर आधारित शासन आणि कृषी विभागाने शेतकऱ्यांना आवश्यक सहकार्य, प्रशिक्षण आणि आर्थिक मदत

उपलब्ध करून दिल्यास हवामान बदलाचा धोका कमी करता येईल.

### परिचय

हवामान बदल हा सध्या संपूर्ण जगासमोर उभा राहिलेला एक गंभीर विषय आहे. हवामानातील सातत्याने होणारे बदल, तापमान वाढ, अनियमित पाऊस, दुष्काळ, पूर, गारपीट, आणि अवकाळी पाऊस यामुळे कृषी क्षेत्रावर मोठ्या प्रमाणात परिणाम होत आहे. विशेषतः शेतीप्रधान देशांमध्ये, जसे की भारत, हवामान बदलाचा थेट परिणाम शेतकऱ्यांच्या उत्पादनावर आणि अर्थव्यवस्थेवर होत आहे. महाराष्ट्र राज्यातील दक्षिण भाग, ज्यामध्ये कोल्हापूर, सातारा आणि सांगली हे जिल्हे प्रामुख्याने येतात, तेथे हवामान बदलाचा कृषी आणि दुग्ध व्यवसायावर मोठा परिणाम दिसून येतो. दक्षिण महाराष्ट्रातील हवामान प्रामुख्याने उष्णकटिबंधीय प्रकारचे असून, उन्हाळ्यात प्रचंड तापमान वाढ, पावसाळ्यात अनियमित पर्जन्यमान तर कधी अतिवृष्टी आणि हिवाळ्यात कमी तापमान यामुळे शेती उत्पादनावर परिणाम होतो. याशिवाय, हवामान बदलामुळे पिकांवरील कीड व रोगांचा प्रादुर्भाव, अतिवृष्टी, मृदेचे वहन, भूजल पातळीतील घट, चार्याची टंचाई, तसेच दुग्ध व्यवसायावर परिणाम दिसून येतो. त्यामुळे हवामान बदलाचे दक्षिण महाराष्ट्रातील कृषी क्षेत्रावर होणारे परिणाम आणि त्यावर उपाययोजना शोधणे आवश्यक आहे. याच दृष्टीने या संशोधनात दक्षिण महाराष्ट्रातील हवामान बदलाचा शेती आणि दुग्ध व्यवसायावर होणार्या परिणामांचा अभ्यास करण्यात आला आहे.

### दक्षिण महाराष्ट्रातील हवामान बदल आणि त्याचा पिकावर होणारा परिणाम

तापमानवाढीमुळे हवामानबदल होतो. तापमान वाढीची अनेक कारणे आहेत, त्यापैकी हरितगृह परिणाम हे एक मुख्य कारण आहे. कोळसा, पेट्रोल यांसारख्या इंधनांचे मोठे प्रमाणात जळल्यानंतर वातावरणात कार्बन डाय-ऑक्साइड मोठे प्रमाणात सोडला जातो. ही प्रक्रिया दीर्घ काळापासून सुरू आहे. विशेषतः औद्योगिक क्रांतीनंतर याच्या प्रमाणात लक्षणीय वाढ झाली आहे. तापमान वाढीबाबतची भीती प्रसिद्ध शास्त्रज्ञ जॉन यांनी इ.स. घष्ट मध्ये त्यांच्या 'वद त्कंपजपवद जेतवनही

जीम म्ती' जउवेचीमतम' या शोधनिबंधात व्यक्त केली होती. दुदैवाने, आज ही भीती सत्य ठरत आहे. मात्र, तापमान वाढीस केवळ कार्बन डाय-ऑक्साइडच जबाबदार नाही, तर क्लोरोफ्लोरोकार्बन्स (ब्ले) आणि इतर घटकही ओझोनच्या रूपासाठी हातभार लावत आहेत. औद्योगिक प्रक्रियेमुळे नायट्रस ऑक्साईड आणि मिथेन यांसारखी हरितगृह वायू हवेत मोठ्या प्रमाणात मिसळत आहेत. यामुळे वातावरणातील तापमान सतत वाढत आहे आणि याचा थेट परिणाम पर्यावरणावर होत आहे.

हवामान बदलासाठी मानवाची बदलती जीवनशैली मोठ्या प्रमाणात जबाबदार आहे. ग्लोबल वॉर्मिंग म्हणजे पृथ्वीच्या हवामान प्रणालीतील सरासरी तापमानात सातत्याने होणारी वाढ होय. सध्या पर्यावरणात मानवाचा वाढता हस्तक्षेप होत आहे, ज्यामुळे हरितगृह वायूंच्या प्रमाणात मोठी वाढ झाली आहे.

म्हणजे पदजमतहवअमतदउमदजंस चंदमस वद बसपउंजम बींदहम च्या अहवालानुसार, ग्लोबल वॉर्मिंगसाठी मुख्यतः कार्बन डाय-ऑक्साइड (ब्ले) उत्सर्जन, जीवाश्म इंधनाचे ज्वलन, सिमेंट उत्पादन आणि मोठ्या प्रमाणातील जंगलतोड जबाबदार आहेत. तापमान बदलामुळे हवामान बदलाची प्रक्रिया वेगाने सुरू झाली आहे. याचा परिणाम म्हणून समुद्राची पातळी वाढत आहे, पर्जन्यमानात अनियमितता निर्माण होते, वाळवंटाचा विस्तार वाढतो, दुष्काळ पडतात, उष्णतेच्या लाटा जाणवतात, अतिवृष्टी आणि गारपीट होते. यामुळे अनेक जैविक प्रजाती नष्ट होण्याच्या मार्गावर आहेत, तर शेती उत्पादन घटत आहे आणि पूर्णपरिस्थिती वारंवार उद्भवत आहे.

वमअमसवचउमदज पदजमससपहमदबम न्दपज (कप) द्वारा प्रसिद्ध केलेल्या 'जंजम व' उंतहपदंस तिउ. मते व' पदकपं २०२४, 'उचंबज व' बसपउंजम बींदहम वद उंतहपदंस तिउमते या अहवालानुसार भारतात हवामान बदलामुळे अल्पभूधारक शेतकऱ्यांच्यावर मोठा परिणाम झाला आहे. देशभरात यावेळी दुष्काळ, खंडित पाऊस, तीव्र उष्णतेच्या लाटा, अचानक तापमान वाढ आणि अतिवृष्टी यासारखे हवामान बदलांच्या घटना मोठ्या प्रमाणात वाढले आहेत. या बदलाचा थेट परिणाम देशातील कृषी क्षेत्रावर झाला असून उत्पादनात

लक्षणीय रित्या घट झाली आहे. खरीप हंगामात ज्वारीच्या उत्पादनात ४६.६%, कापूस ४७.५%, बाजरी ३६.३%, तूर २४%, रबी हंगामातील गहू ४५%, हरभरा ४४%, बटाटे १६.३%, मूग २६.७%, उडीद २३% इतक्या मोठ्या प्रमाणात उत्पादनात घट झाली आहे. ही उत्पादनातील घट मुख्यतः गेल्या पाच वर्षांतील तीव्र हवामान बदलामुळे झाली आहे. अल्पभूधारक शेतकऱ्यांच्या अर्थकारणावर याचा मोठा परिणाम झाला आहे. पिकांचे उत्पादन घटल्यामुळे शेतकऱ्यांच्या अर्थकरणावर याचा मोठा परिणाम झाला आहे. पिकांचे उत्पादन घटल्याने शेतकऱ्यांच्या उत्पन्नात मोठी गट झाली आहे. परिणामी त्यांचे कुटुंबीय आर्थिक संकटात सापडले आहे. देशाच्या सर्वच भागांमध्ये हवामान बदलाचा कमी अधिक प्रभाव जाणवतो आहे, मात्र अल्पभूधारक शेतकऱ्यांवर याचा सर्वाधिक विपरीत परिणाम होताना दिसतो.

हवामान बदलाचा दक्षिण महाराष्ट्रातील शेती व शेती बरोबरच इतर जोडधंद्यांवर मोठा परिणाम होत आहे. विशेषतः द्राक्षे, ऊस, भाजीपाला आणि फळपिके यावर हवामान बदलामुळे विविध रोगांचा प्रादुर्भाव दिसतो.

हवामानातील बदल विशेषतः तापमान वाढ आणि अनियमित पाऊसमान या किडीच्या वाढीस पूरक ठरतात. यामुळेच ऊस उत्पादक शेतकऱ्यांना मोठ्या आर्थिक नुकसानीला सामोरे जावे लागते. खंडित पावसामुळे उसावर लोकरी मावा पडतो. द्राक्ष पिकावर मिलीबगज आणि भुरी यासारख्या रोगांचा मोठ्या प्रमाणावर प्रादुर्भाव होतो. तापमानातील चढ उतार आणि वाढलेली आद्रता यामुळे या रोगांचे प्रमाण वाढते. परिणामी द्राक्ष बागायतदारांना मोठ्या तोट्याचा सामना करावा लागतो. भात पिकावर तापमान वाढ झाल्यास शेंडे पोखरणाऱ्या अळ्या, खोड पोखरणाऱ्या अळीचा प्रादुर्भाव वाढतो. यामुळे उत्पादनात घट येते. ज्वारी पिकावर अधिक पाऊस झाला तर खोडमाशीचा प्रादुर्भाव होतो. टोमॅटो, भाजीपाला, फळबागा यावर हवामान बदलामुळे करपा रोग आणि बुरशीजन्य रोगांचा मोठ्या प्रमाणावर प्रादुर्भाव होतो. बुरशीचा प्रादुर्भाव वाढला तर भाजीपाला पिकांचे मोठे नुकसान होते. कांदा पिकावर करपा रोग होण्याचे प्रमाण वाढते. शेंड्यांची वाढ खुंटते. याचबरोबर कांदा पातीवर ठिपके पडतात. त्यामुळे कांद्याचे उत्पादन व

गुणवत्ता घटते.

हवामान बदलाच्या तीव्र परिणामामुळे सन हज्ज्याघ मध्ये ऐन उन्हाळ्यातच पावसाळ्यासारखी स्थिती निर्माण झाली. वादळी पाऊस आणि गारपीटीने मोठे थैमान घातले होते. या अनियमित आणि बिगर मोसमी पावसामुळे शेतीचे मोठे प्रमाणात नुकसान झाले. पूर्वी क्वचितच पडणारा गारा आणि अवकाळी पाऊस आता सातत्याने होत आहे, त्यामुळे शेतकऱ्यांची मोठी हानी होत आहे.

विशेषतः, सन २०१४ मध्ये फेब्रुवारी आणि मार्च या दोन महिन्यांत मोठे प्रमाणात गारपीट झाल्याने शेतीला मोठा फटका बसला. त्याआधी सन हज्ज्याघ ते हज्ज्याघ या पाच वर्षांच्या कालावधीत मुख्यतः दुष्काळी परिस्थिती होती, परिणामी उत्पादनावर मोठा परिणाम झाला. मात्र, सन हज्ज्याघ पासून सातत्याने अतिवृष्टी, अवकाळी पाऊस आणि गारपीट होत असल्याने शेती क्षेत्राला मोठे प्रमाणावर तडाखा बसत आहे.

या नैसर्गिक आपत्तीमुळे शेती उत्पादनावर मोठा परिणाम झाला असून, शेतकऱ्यांचे आर्थिक नुकसान वाढत आहे. हवामान बदलाचा हा धोका दिवसेंदिवस वाढत असल्याने शेतकऱ्यांना अनिश्चिततेचा सामना करावा लागत आहे.

दक्षिण महाराष्ट्रामध्ये २००५, २००६, २००७, २०१५, २०१६ यावेळी अतिवृष्टी झाली. नद्यांना महापूर आला. दीर्घकाळ शेतामध्ये पाणी तुंबून राहिल्यामुळे ऊस, सोयाबीन, भुईमूग आणि इतर पिके बहुतांशतः कुजून गेलीत. सुरुवातीच्या महापुरामध्ये पाण्याचा अंदाज ना आल्यामुळे पशुधन मोठे प्रमाणामध्ये पाण्यात वाहून गेले. शेतजमीन मोठे प्रमाणात वाहून गेल्यामुळे शेत जमिनीचा दर्जा खालावला. शेती आणि शेती पूरक उद्योग धंद्यात शेतकऱ्यांचे अतोनात नुकसान झाले. यामुळे शेतकऱ्यांचे जीवन सर्वाधिक प्रभावित झाले. शासनाने नुकासान भरपाई पुरेशी ठरत नाही. पुन्हा नव्याने सुरळीत होण्यासाठी शेतकऱ्याला प्रचंड कष्ट करावे लागतात आणि मोठा कालावधी लागतो.

सोयाबीन हे कोल्हापूर जिल्ह्यातील हुकमी पिक होते मात्र काही वर्षांपासून अतिवृष्टीमुळे या पिकावर प्रचंड परिणाम झाला आहे. पिक शेतातच कुजत

असल्यामुळे आम्ही हे पिक घेत नाही जमीन तशीच पड ठेवतो.

सांगली जिल्ह्यातील द्राक्ष बागांना हवामान बदलाचा वारंवार फटका बसतो. सन २०२२-२३ मध्ये झालेल्या अवकाळी पाऊस आणि हवामान बदलामुळे सांगली जिल्ह्यातील द्राक्ष बागांना मोठा फटका बसला होता. सततचा ढगाळ हवामान अचानक थंडी अनियमित पावसाने द्राक्ष बागांमध्ये बुरशीजन्य आणि जिवानूजन्य रोगाचा प्रादुर्भाव मोठे प्रमाणात झाला विशेषतः डाऊनी रोगामुळे द्राक्षांच्या मण्यांना कुज येवू लागली. परिणामी द्राक्ष बागांचे सुमारे हज्ज टक्के नुकसान झाले. अवकाळी पावसामुळे द्राक्ष मण्यांवर पाणी साचल्याने त्यांना तडे गेले आणि बाजारपेठेत द्राक्षांना मागणी घटली. यामुळे शेतकऱ्यांचे कोट्यवधी रुपयांचे नुकसान झाले. वातावरणातील अनिश्चित बदलामुळे द्राक्ष उत्पादक शेतकऱ्यांची मोठे प्रमाणात आर्थिक घट झाली.

सप्टेंबर २०२४ मध्ये सांगली जिल्ह्यात तासगाव, आटपाडी, पलूस, खानापूर, कडेगाव या दुष्काळी आणि मिरज वाळवा या तालुक्यात झालेल्या अतिवृष्टीमुळे शेतकऱ्यांना मोठ्या प्रमाणावर नुकसान सोसावे लागले. जून पासून सततच्या पावसामुळे जिल्ह्यातील ४,८६७ हेक्टर क्षेत्रातील विविध पिकांचे कोट्यवधी रुपयांचे नुकसान झाले. विशेषतः भाजीपाला, सोयाबीन, पपई, भात, भुईमूग, हळद, केळी आणि द्राक्ष या पिकांना अतिवृष्टीचा मोठा फटका बसला.

अतिवृष्टीमुळे शेतातील पिके पाण्यात बुडाल्याने मोठे प्रमाणात पिकांची नासाडी झाली. द्राक्ष मण्यांना तडे गेल्याने आणि भाजीपाला कुजल्याने शेतकऱ्यांना आर्थिक संकटाचा सामना करावा लागला. यामुळे शेतकऱ्यांची मोठे प्रमाणात आर्थिक हानी झाली असून. प्रशासनाने मात्र कमी नुकसान भरपाई दाखवली यामुळे शेतकरी नाराज झाले त्यांनी शासनाने योग्य भरपाई देण्याची मागणी केली.

**दक्षिण महाराष्ट्रातील अतिवृष्टीमुळे झालेल्या पिकांच्या नुकसानीवर शासनाची भरपाई**

सन २०२३ च्या डिसेंबर महिन्यात दक्षिण महाराष्ट्रासह राज्यभरात अतिवृष्टी, वादळी पाऊस आणि पुरामुळे मोठे प्रमाणात पिकांचे नुकसान झाले. या

नैसर्गिक आपत्तीमुळे भात, ऊस, द्राक्ष, भाजीपाला आणि फळपिकांना मोठा फटका बसला. शेतकऱ्यांनी शासनाकडे नुकसान भरपाईची मागणी केली. महाराष्ट्र शासनाने जानेवारी ते ऑक्टोबर २०२३ या कालावधीत झालेल्या नुकसानीसाठी १,७५७ कोटी रुपयांची भरपाई वितरित करण्याचा निर्णय घेतला. मात्र प्रत्यक्षात झालेल्या नुकसानीच्या तुलनेत ही भरपाई अत्यल्प ठरली. शेतकऱ्यांचे आर्थिक नुकसान मोठ्या प्रमाणात झाले असून, शासनाने त्यांना अपेक्षित मदत दिली नाही. यामुळे शेतकऱ्यांच्या आर्थिक स्थितीवर मोठा परिणाम झाला आहे. प्रशासनाकडून अनेकवेळा चुकीचे पंचनामे केले जातात. शेतीचे जास्त नुकसान होवूनही ते कमी प्रमाणात दाखवले जाते. तसेच पिक बाबतही अनेक तक्रारी असल्यामुळे शेतकरी पिक विमा घेत नाहीत.

#### हवामान बदलाचा दुग्ध व्यवसायावर परिणाम

हवामान बदलाचा परिणाम केवळ शेतीपुरता मर्यादित राहत नाही, तर शेतीला पूरक व्यवसाय असलेल्या दुग्ध व्यवसायावरही त्याचा मोठ्या प्रमाणात परिणाम होतो. दुग्ध व्यवसाय हा दक्षिण महाराष्ट्रातील मुख्य शेतीपूरक जोडधंदा आहे. दुष्काळ पडल्यामुळे पशुधन मोठ्या प्रमाणात कमी होते. राज्याच्या सन २०२२-२३ च्या आर्थिक पाहणी अहवालानुसार राज्यामध्ये १६६७ मध्ये ३,६३,६३,००० पशुधन होते तर २०२६ मध्ये पशुधन ३,३०,८०,००० इतके झाले.

दुष्काळ पडल्यास पशुधनासाठी आवश्यक असलेल्या चार्याची टंचाई निर्माण होते, परिणामी शेतकऱ्यांना मोठ्या प्रमाणावर पशुधनाची विक्री करावी लागते.

दुष्काळ आणि पावसातील अनियमिततेमुळे दक्षिण महाराष्ट्रात चार्याची टंचाई अधिक तीव्र होते. त्यामुळे शासनाला चारा छावण्यांचे आयोजन करावे लागते, परंतु मागणीच्या तुलनेत पुरवठा कमी असल्यामुळे अनेक ठिकाणी शेतकऱ्यांना पुरेसा चारा मिळत नाही. यामुळे शेतकऱ्यांना जनावरांचे पालन-पोषण करणे कठीण होते आणि पशुधनाची विक्री करण्याची वेळ येते. याचा थेट परिणाम दुग्ध व्यवसायावर होतो.

वाढत्या तापमानामुळे पशुधनावर उष्णतेचा ताण (भ्रंज जतमे) येतो. तापमान वाढल्याने जनावरांची

चयापचय प्रक्रिया (डमजंडवसपेउ) बिघडते, त्यामुळे त्यांची रोगप्रतिकारक क्षमता कमी होते. उष्णतेच्या ताणामुळे जनावरे कमी खाद्य खाऊ लागतात आणि पाणी पिण्याचे प्रमाण वाढते, परिणामी दुधाचे उत्पादन घटते. तसेच, पोषणमूल्यांचा अभाव आणि सततचा ताण यामुळे जनावरांमध्ये दुधाचा ज्वर, लालमूत्र, आणि विविध आजार होण्याचे प्रमाण वाढते.

याचप्रमाणे तापमानातील तीव्र घट झाल्यास जनावरांच्या आरोग्यावरही परिणाम होतो. थंडीत सकाळच्या वेळी जनावरांचे स्नायू आखडतात, त्वचेवर परिणाम होतो आणि कासदाहाची समस्या निर्माण होते. तापमान कमी झाल्यास वासरांचे वजन घटते, त्यांची रोगप्रतिकारक क्षमता कमी होते आणि दूध उत्पादनावर परिणाम होतो. अशा परिस्थितीत शेतकऱ्यांना दुग्ध व्यवसाय टिकवून ठेवण्यासाठी अतिरिक्त खर्च करावा लागतो, जे त्यांच्यासाठी मोठे आर्थिक संकट ठरते.

हवामान बदलामुळे दुग्ध व्यवसायावर होणाऱ्या प्रतिकूल परिणामांना आळा घालण्यासाठी शासनाने शेतकऱ्यांना आधुनिक तंत्रज्ञानावर आधारित दुग्ध उत्पादन पद्धतीची माहिती द्यावी. तसेच चारा निर्मितीसाठी अधिक योजना राबवाव्यात, पाणी व्यवस्थापनावर भर द्यावा आणि उष्णतेपासून जनावरांचे संरक्षण करण्यासाठी विशेष योजना लागू कराव्यात. अन्यथा हवामान बदलामुळे भविष्यात दुग्ध व्यवसायावर अधिक मोठे संकट निर्माण होण्याची शक्यता आहे.

दक्षिण महाराष्ट्रामध्ये तापमान वाढीमुळे हवामान बदलाचा शेती आणि शेतीपूरक उद्योगांवर मोठा परिणाम झाला आहे. अतिवृष्टी, गारपीट, महापूर, वादळे यांसारख्या नैसर्गिक आपत्तीमुळे शेतकरी मोठ्या प्रमाणात त्रस्त झाला आहे. वारंवार होणाऱ्या अतिवृष्टीमुळे अनेक शेतकरी पिके घेण्याचे टाळत आहेत, परिणामी त्यांचे आर्थिक नुकसान वाढत आहे. हवामान बदलाचा परिणाम दुग्ध व्यवसायावरही मोठ्या प्रमाणात जाणवत आहे, यामुळे शेतकऱ्यांचे उत्पन्न घटत आहे. हवामान बदलाच्या या संकटाचा सर्वाधिक फटका अल्पभूधारक शेतकऱ्यांना बसत आहे. शासनाकडून मिळणारी नुकसान भरपाई अपुरी ठरत आहे. तसेच, पिक विमा आणि पंचनाम्याच्या प्रक्रियेत शेतकऱ्यांच्या समस्या अद्याप सुटलेल्या नाहीत.

त्यामुळे शेतकऱ्यांमध्ये असंतोष वाढत आहे.

यावर उपाय म्हणून शासनाने हवामान बदलासंदर्भात शेतकऱ्यांना वेळोवेळी योग्य मार्गदर्शन करणे आवश्यक आहे. त्याचप्रमाणे, नुकसान भरपाई तत्काळ आणि पुरेशी देण्यात यावी. आर्थिक मदतीसोबतच शेतकऱ्यांना मानसिक आधार देण्यावरही भर दिला पाहिजे, जेणेकरून ते नव्या आत्मविश्वासाने शेती आणि शेतीपूरक व्यवसाय पुन्हा उभारू शकतील.

**निष्कर्ष:**

**१. तापमानातील वाढ:** जागतिक तापमानवाढीमुळे दक्षिण महाराष्ट्रात तापमान सरासरीपेक्षा अधिक वाढत आहे, याचा परिणाम म्हणून पिकांचे उत्पादन कमी होत आहे आणि उत्पादकता घटत आहे. उष्णतेमुळे द्राक्ष, ऊस, भाजीपाला आणि इतर नगदी पिकांवर विपरीत परिणाम होत आहे. मागील काही वर्षात पावसाचे प्रमाण अनियमित झाले आहे. कमी किंवा जास्त पावसामुळे शेतीचक्र बिघडत आहे. यामुळे खरीप आणि रब्बी हंगामांवर विपरीत परिणाम होत आहे.

**२. कीड व रोगांचा प्रादुर्भाव:** हवामान बदलामुळे कीटक आणि रोगांचे प्रमाण वाढले आहे. यामुळे उत्पादनात घट आणि खर्चात वाढ होत आहे.

खंडित पावसाचे वाढते प्रमाण, अनपेक्षित पाऊस, गारपीट आणि वादळामुळे पिकांचे मोठे नुकसान होत आहे. ऊस, भाजीपाला, भात यासारख्या पिकांना मोठा फटका बसत आहे.

**३. जमिनीची गुणवत्ता कमी होणे:** हवामान बदलामुळे अतिवृष्टी आणि महापूर यामुळे मातीचे मोठ्या प्रमाणात वहन होते त्यामुळे जमिनीची सुपीकता घटत आहे. याचा थेट परिणाम उत्पादनावर होत आहे.

**४. शेतकऱ्यांच्या आर्थिक स्थितीवर परिणाम:** हवामान बदलामुळे उत्पादन खर्च वाढतो आणि उत्पन्न घटते. यामुळे शेतकऱ्यांचे अर्थकारण डळमळीत होत आहे आणि स्थलांतराची समस्या निर्माण होत आहे.

**५. शासनाचे प्रयत्न:** शासनाने आपत्तीच्या काळात शेतकऱ्यांना मदत देवू केली आहे पण नुकसानीच्या प्रमाणात ती पुरेशी ठरत नाही.

**शिफारसी:**

**१. पिकांचे विविधीकरण:** शेतकऱ्यांनी हवामान

बदलानुसार कमी पाणी लागणारी, अल्पकालीन आणि हवामान—प्रतिकारक पिके घेण्यावर भर द्यावा. हवामान बदल सहन करणाऱ्या सुधारित आणि संशोधित बियाण्यांचा वापर करावा.

**२. पाणी व्यवस्थापन:** ठिबक आणि तुषार सिंचन पद्धतीचा अधिकाधिक अवलंब करावा. तसेच जलसंधारणासाठी शेततळे, बंधारे, पाणी पुनर्वापर तंत्रज्ञानाचा अवलंब करावा.

**३. माती आरोग्य व्यवस्थापन:** मृद संरचनाद्वारे मातीची गुणवत्ता टिकवून ठेवण्यासाठी हरित खतांचा वापर करावा, पीक फेरपालट (बतवच त्वजंजपवद) करावी, आणि सेंद्रिय शेतीला प्रोत्साहन द्यावे.

**४. नवीन तंत्रज्ञानाचा वापर:** हवामान अंदाज प्रणाली, कीड व्यवस्थापन प्रणाली, आणि हवामान अनुकूल तंत्रज्ञानाचा वापर करावा. उदाहरणार्थ दृ मोबाइल ॲप्स, हवामान सल्ला सेवा इत्यादी.

**५. शासनाची मदत आणि धोरणे:** हवामान बदलाच्या अनुषंगाने शासनाने शेतकऱ्यांना पीकविमा, आर्थिक सहाय्य, आणि शेतीसाठी आवश्यक तांत्रिक मार्गदर्शन उपलब्ध करून द्यावे. वेळेवर आणि योग्य प्रमाणात नुकसान भरपाई द्यावी.

**६. शेतकरी गट निर्माण करणे:** शेतकऱ्यांनी एकत्र येऊन हवामान अनुकूल शेतीसाठी एकत्रित योजना तयार कराव्यात. तसेच कृषी संशोधन केंद्रांशी संपर्क ठेवावा.

**७. कृषी प्रशिक्षण आणि जनजागृती:** शेतकऱ्यांना हवामान बदलाचे ज्ञान मिळावे यासाठी कृषी विभागाने नियमित प्रशिक्षण आणि कार्यशाळा आयोजित कराव्यात.

**स्थानिक हवामान अंदाज सेवा:** गाव पातळीवर हवामान अंदाज सेवा उपलब्ध करून द्याव्यात, जेणेकरून शेतकऱ्यांना पीक नियोजन आणि संरक्षणासाठी योग्य मार्गदर्शन मिळेल.

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## AN OVERVIEW OF GOAT FARMING IN INDIA

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### Abstract: -

In this research paper researcher conducting reviews about goat farmers cooping strategy, sustainable livelihood security and its role in rural poor farmers' life, commercial goat farming, rearing practices, production performance, challenges and opportunities of goat production, technical efficiency, socio economic status and aspects & prospectus of goat production as well as shepherds in rural area. The Goat farming plays an important role in the livelihood security and income generation option for the poor people. The overall observation of their study was the goat enterprise to be profitable income generating avenue in the study area. So, if any improve the socio-economic status of landless, marginal and small farmers.

The main constraints such as seasonally related low levels of nutrition, mortality and morbidity losses, lack of good quality breeding stock and buck & veterinary services, poor flock management, marketing opportunities and government schemes for extension, non-availability of green fodder, lack of support. Finally, researcher suggested that government should make available veterinary services and medical treatment for goat keepers in their village with

free of cost and provide the information of vaccination, credit facility, and quality improvement of goat breed, shelter facility and training of advance rearing management.

**Key Words:** - Goat Farming, Goat Farmer, Feed, Veterinary Services etc.

### 1. INTRODUCTION: -

In this researcher paper researcher conducted reviews about goat farmers cooping strategy, sustainable livelihood security and its role in rural poor farmers' life, commercial goat farming, rearing practices, production performance, challenges and opportunities of goat production. The researcher also reviewed literature about technical efficiency, socio economic status, aspects and prospectus of goat production as well as shepherds in rural area. This research paper reviewed about supply chain management, constraint, feasibility for sustainability and profitability in goat farming and production. The reviews also related with animal health, milking hygiene and raw milk quality. Goat farming plays an important role in the livelihood security and income generation option for the poor people. The overall observation of their study was the goat enterprise to be profitable income generating avenue in the study area. So, if any improve the socio-economic status of landless, marginal and small farmers.

### 2. RESEARCH OBJECTIVES:

The main objective of this research paper is to study concept of Goat farming and the conducting an overview on current situation of Goat Farming in India.

### 3. RESEARCH METHODOLOGY: -

In this present research paper researcher was decided to take data from the secondary sources. The review was collected from published literature, website and relevant information published in journals and books of various authors, relating to the topic selected from different libraries.

### 4. REVIEW OF LITERATURE: -

**1. Shalander Kumar and A. D. Upadhyay (Dec.**

**2009)** published a research paper entitled "Goat Farmer's Cooping Strategy for Sustainable Livelihood Security in Arid Rajasthan: An empirical Analysis". They analyzed input output model used to quantify the magnitude of linkage amongst different components of farming system. They concluded that the goat-based farming system evolved by the farmers is not only economically valuable but sustainable also. The farmers are able to generate more income, if the existing goat production is fine-tuned with modern goat rearing practices. The innovation idea of farmers of keeping a part of their land fallow for grazing their goats and sheep during the lean season needs to be used as an opportunity to encourage the farmers to develop this fallow land as pasture with recommended legume and non- legume grasses.

**2. Shalander Kumar, C. A. Ramarao, K. Kareemulla and B. Venkateswarlu:** - in their research article "Role of Goats in Livelihood Security of Rural Poor in The Less Favored Environments" they said that goat rearing has distinct economic and managerial advantages than other livestock. Because there is less initial investment, low input requirement, higher prolificacy, early sexual maturity and ease in marking. They were found that goats play an important role in the livelihood security and income generation option for the poor people. There were constraints such as seasonally related low levels of nutrition, mortality and morbidity losses, lack of good quality breeding stock, poor flock management and poor marketing opportunities. There would be three distinct goat's production system wise large scale commercial farms, smaller units under semi- intensive and intensive system raised. Each goat production system would require a different type of technological, policy and institutional support.

**3. Mr. Sarnaik D. G. (2015)** he has submitted a research project namely "A Study on Goat Rearing Management Practices Followed by Goat Keepers in Kolhapur District." He has studied

that the gap between recommended management practices of goat rearing and actual practices followed by the goat keepers. In this study he found that goat keepers in Kolhapur district were middle age group, educated up to secondary school level, possessed marginal holding and medium level of annual income, source of information and social participation. Finally, he was suggested that government should make available veterinary services and medical treatment for goat keepers in their village with free of cost. They also provide the information of vaccination, credit facility, and quality improvement of goat breed, shelter facility and training of advance rearing management.

**4. Shalandar Kumar (2007)** he published a research paper on "Commercial Goat Farming in India: An emerging Agri- Business Opportunity." He has analyzed economic and prospects of commercialization of goat production in the country for his study. He found that they have lack knowledge about package of practices of improved goat farming, poor prophylaxis, non-availability of vaccines, lack of personal attention, poor access of veterinary doctor. He suggested that service center should be established for providing technical market, market information and superior quality breeding animals because this would enable the farmers.

**5. Bimal Puthuparampil Bashir and R Thirupathy Venkatachalapathy ()** they published a research paper on 'Study on Supply Chains of Goats in Northern Kerala'. This study was undertaken to analyze the socio-economic status of the goat farmers and various supply chains of goats in the northern part of Kerala. This study was conducted by six centers of the All India Coordinated Research Project (AICRP) during the period of 2015-16 for the improvement of Malabari goat. The study identified that majority of the goat farmers have less land holding 25 % and major players in goat rearing were women. Farmers mostly rear goat for meat purpose and other sources income includes selling

of goat dung (67%) and just 18 to 7 per cent of the farmers were utilized returns by other ways. The study also throws light on major players involved in goat trades such as traders, commission agents, butchers etc. and also reveals 5 various channel forms of supply chains involved in goat marketing. According to them, the goat producer company as the best supply chain for both goat farmers as well as consumers because it provides maximum profit to goat farmers and moreover, provides cheapest chevron at the consumer level.

**6. Upendra Kumar, M.L. Reager, Ranveer Singh, Geeta Balwadaand Deepak Chaturvedi (2014)** they published a paper on 'Economics of Goat Farming under Traditional Low Input Production System in Bikaner District.' The aim of this research was to evaluate the economic performance of goats under traditional farming system. For this purpose, they have selected four blocks of Bikaner district of Rajasthan and collected data from 120 farmers of different flock. This Study was found that small flock size (5-10 goats) was most profitable rather than 10-25 and 25-50 goats. As per research the net return to be Rs. 6895, 6650 and 6492 per annum of goat, respectively. They said the net profit (per goat/annum) decreased linearly with the increase of flock sizes due to inadequate nutrition and management practices by larger goat keepers. The major source of income of farmers in study area was selling of goats (49.93%), by milk (41.85%) and manures (4.20%). They also found that the small goat farmers mostly followed stall feeding with little bit grazing. Whereas the large goat keepers raise their goats solely on browsing and grazing stubble of field crops, natural pasture, etc. the old men, women and children of family playing major role in raring of goats. They took care, time to time of their flocks. So, the family labour was also included in feeding expenditure. Therefore, rearing of goat cannot sustain only on grazing resources, needs to switch over to semi-intensive

and intensive system of management.

**7. M. Prabh, K.N. Selvakumar, A. Serma Saravana Pandian, G. Senthil Kumar and N. Meganathan(2011)** they published a research paper on "Profitability Analysis of Goat Farming in Tamil Nadu". The aim of study was to analyze the profitability of goat farming. They revealed that goat flock size was highest in landless farmers because the rearing goats were the main source of occupation. The major investment pattern portion of their total average fixed investment was on accounted cost of goat. They also found that the net returns with and without imputed value of family labour per goat were highest in marginal farmers. The overall observation of their study was the goat enterprise to be profitable income generating avenue in the study area. Therefore, if any improvement in their production level it will be improve the socio-economic status of landless, marginal and small farmers.

**8. PRINCE LUTHRA, S.P. SINGH, S.S. SANGWAN, GAUTAM, ANIKA MALIK and RACHNA (2019)** they published research paper on 'Knowledge of Farmers about Recommended Goat Rearing Practices in Haryana'. The objective of this research was to analyze the extent of knowledge about scientific rearing goat practices. They selected 120 goat farmers from 12 villages of Sirsa, Bhiwani and Mahendergarh districts of Haryana. The study indicated that the small farmers had maximum knowledge about gestation period of goats and hence ranked first and the small goat farmers had least knowledge about mating method. Further, analysis revealed that large category farmers had more knowledge as compared to small and medium farmers. They observed that large category of farmers had more knowledge as compared to small and medium farmers about direction of shed. Whereas, all the three categories of farmers had maximum knowledge about colostrums feeding to newly born kids. They also observed that the small category was aware about dew-

orming and none of the farmers knew about horned bucks, buck kids' castration and dipping of kids. Low level of knowledge was noticed about maintenance of animal records, disbudding of kids' and application of dipping. The study revealed that the farmers of small and medium knowledge about provision of sanitary condition and category of farmers with slight deviations in the extent of knowledge. The farmers of small and medium category knew about age of selling of kids followed by place for selling animals. But the large category of farmers had higher knowledge about this. The moderate knowledge may be due to farmers' moderate level of education and moderate socio-economic background, lack of availability of organized markets or distant locations of markets. Minimum knowledge was noticed in the areas viz. weight of kid at time of selling.

**8. Sarveshwar Koma, Sariput Landge, Vaishali Banthiya and Giridhar Shende (2017)** they published a research paper on 'Constraint in Goat Farming for Tribal Goat Keepers in Maharashtra'. The study selected 150 goat keepers from five villages from Korchi, Kurkheda, and Dhanora talukas. They found that financial crunch was the foremost constraint for the tribal goat farmers it may because of widespread poverty amongst the tribal people in this area. As per their research, high cost of feeding, non-availability of bank loan and fluctuating market price for inputs were main constraint faced by the goat farmers. Non availability of fodder during summer, lack of training and non-remunerative price for adult goats was another important constraint faced by the tribal goat farmers. It also showed that tribal goat keepers facing major problem of non-availability of green fodder especially during the summer season. This study also revealed that the tribal goat keepers facing constraints like non-availability of good quality buck, lack of government schemes, lack of extension support and non-availability of veterinary service in time. They recommended that

availability of veterinary doctors in these remote tribal villages were ensured by the recent appointment of veterinary doctors in the region. Similar constraints were also reported by other researcher with varying difference in terms of the various factors.

**9. P M Mandavkar, A A Hanmante and M S Talathi (2015)** they published a research paper on 'Status of Goat Farming Practices, Knowledge and Adoption Status of Technologies in North Konkan Coastal Zone of Maharashtra'. For this study purpose they selected 30 respondents out of 100 participants who attended vocational training on goat rearing organized by Krishi Vigyan Kendra, Roha- Raigad and technological interventions provided to goat rearing farmers in between 2010 to 2012 years. This study conducted in Raigad district of North Konkan Coastal Zone of Maharashtra. The data collected with help of well structure interview schedule. The aim of this study was to know the status of goat farming practices the knowledge and adoption level of technologies learned during training programme by the goat keepers in study area. This study revealed that respondents were aware about enriched in the management practices like deworming of goats, feeding of colostrum's to kids and use of vaccine like PPR, ET, FMD etc. They also found that the highest increase in adoption feeding of colostrum's to kids, deworming of goats and use of mineral mixture and concentrate feed. Lack of open fields was the major problem reported by most of the respondents followed by lack of timely veterinary facility at the village level. They recommended that for overall improvement in status of goat management practices in enrichment or gain in knowledge and increase in adoption of improved technologies, increase in employment and increase in total income was possible by organizing trainings and technological interventions through diagnostic visits, animal health camp, farm and home visits by the subject matter experts in the rural area at the door

step of the poor farmers.

## 5. FINDINGS, SUGGESTION AND CONCLUSION:-

After conducting reviews of goat researcher studied about farmers cooping strategy, sustainable livelihood security and its role in rural poor farmers' life, commercial goat farming, rearing practices, production performance, challenges and opportunities of goat production. The researcher also reviewed literature about technical efficiency, socio economic status, aspects and prospectus of goat production as well as shepherds in rural area. This research paper focused on supply chain management, constraint, feasibility for sustainability and profitability in goat farming and production. The reviews also related with animal health, milking hygiene and raw milk quality.

After detail and sincerely study of all review of literature related to research topic the researcher reveals that the present study is differ from the existing research. There were constraints such as seasonally related low levels of nutrition, mortality and morbidity losses, lack of good quality breeding stock, poor flock management and poor marketing opportunities. The tribal goat-keeper facing more problems like non-availability of green fodder, good quality buck & veterinary services, quality buck, lack of government schemes and extension support.

Finally, suggested that government should make available veterinary services and medical treatment for goat keepers in their village with free of cost and provide the information of vaccination, credit facility, and quality improvement of goat breed, shelter facility and training of advance rearing management. Researcher should have suggested that for overall improvement in status of goat management practices in enrichment or gain in knowledge and increase in adoption of improved technologies, increase in employment and increase in total income was possible by organizing trainings and technological interventions

through diagnostic visits, animal health camp, farm and home visits by the subject matter experts in the rural area at the door step of the poor farmers.

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## Correlation study in Lablab bean (Lablab purpureus (L.) Sweet

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**15. Jasvinder Singh Soodan<sup>1</sup>, Sharad Kumar<sup>2</sup> and Amandeep Singh<sup>3\*</sup> (2020)** they published a paper entitled that "Effect of Goat Rearing on Farmers' Income" International Journal of Livestock Research, Vol. 10 (8) Aug'2020 eISSN: 2277-1964 NAAS Rating 2020 5.36 <http://www.ijlr.org>

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### Abstract

The field experiment was conducted by Educational and Research Farm, Department of Agricultural Botany, College of Agriculture, Dapoli, during rabiseason 2015-2016 and 2016-2017. The investigation was aimed at morphological, physiological and biochemical characterization of five lablab bean genotypes (viz. genotype 63, genotype 83, genotype 54, genotype 84 and a check Konkan Wal-2) in three sowing dates (viz. 5<sup>th</sup> Nov, 15<sup>th</sup> Nov and 25<sup>th</sup> Nov) under Konkan rabi condition. The whole experiment was analyzed in split plot design in four replications and five genotypes.

A significantly highest positive correlation with seed yield/plant was exhibited by net assimilation rate (0.773) followed by harvest index (0.394) indicating better carbon assimilation and translocation efficiency. Whereas negative but non-significant correlation with seed yield/plant was exhibited by rate of transpiration (-0.156) followed by plant height (-0.146). Rate of transpiration was found negatively correlated with all the morphological, physiological and yield contributing parameters.

### Introduction:

Lablab bean has the capacity to fix atmospheric nitrogen in the soil and it can do rela-

tively well even under poor soil fertility conditions since it is a leguminous crop. It has importance in human nutrition. It contains around 24.9 per cent protein, being next to soybean and 2 to 2.5 times as much in cereals. Its amino acid composition is also moderately well balanced, with high lysine content (6.1%). A mixed diet of cereal and pulse has more biological value than either component alone and can meet the requirement of the protein of animal origin.

The entire species has been distributed over the different parts of India, Australia, Africa, and Latin America. India is the major pulse growing country in the world sharing about 25% of total production and 32% of global acreage in the world. In India pulses are grown on an area of 24.31 million ha with a production of 19.27 million tonnes of grains with an average yield of 631.9 kg/ha. Maharashtra ranks first in acreage and production of pulses followed by Madhya Pradesh, Uttar Pradesh, Rajasthan, Orissa, Haryana, Gujrat, Karnataka, Tamilnadu and Andhra Pradesh. In Maharashtra, the total pulse production was 34.46 lakh tonnes, which was produced from 38.26 lakh ha with an average production of 900 kg/ha in the year 2015-2016 while in Konkan region total pulse area was 27.2 thousand ha which produced 16.70 thousand tonnes (Anonymous, 2016). Lablab bean is grown in all the districts of Konkan region of Maharashtra viz. Thane, Palghar, Raigad, Ratnagiri and Sindhudurg with gram, lentil, horse gram with an average productivity of 537 kg/ha (Anonymous, 2016). The correlated coefficients into the direct and indirect effects of independent variables on a dependent variable with the inclusion of more variables in correlated study.

#### Material and method:

Correlation and coefficient of different lablab bean genotypes as influenced by different sowing date under Konkan Rabi was carried out at Agriculture Botany Research Farm, Department of Agriculture Botany, College of Agri-

culture, Dapoli during 2015-2016 and 2016-2017. The investigation was aimed at correlation coefficient of five lablab bean genotypes (viz. genotype 63, genotype 83, genotype 54, genotype 84 and a check Konkan Wal-2) in three sowing dates (viz. 5<sup>th</sup> Nov, 15<sup>th</sup> Nov and 25<sup>th</sup> Nov) under Konkan rabi condition with an object to study extent of thermo and photosensitivity of different lablab bean genotypes. The whole experiment was analyzed in split plot design in four replications, plot size: 3 × 1.5 m<sup>2</sup>, spacing: 30 × 15 cm and fertilizer dose: 25 : 50 : 00 kg/ha.

**Table 1. Genotype, cross, pedigree and character of selected lablab bean genotypes.**

| Sr. No. | Genotypes    | Cross           | Pedigree           | Character     |
|---------|--------------|-----------------|--------------------|---------------|
| 1       | Genotype 63  | DPLW61 X DPLW29 | DPLW-2010-6-5-3-20 | Bushy basal   |
| 2       | Genotype 84  | DPLW46 X DPLW61 | DPLW-2010-9-1-2-9  | Viny overall  |
| 3       | Genotype 53  | DPLW15 X DPLW29 | DPLW-2010-5-4-2-20 | Viny erect    |
| 4       | Genotype 83  | DPLW48 X DPLW51 | DPLW-2010-8-4-2-19 | Viny terminal |
| 5       | Konkan wal-2 | -               | -                  | -             |

#### Result and Dissucton: Correlation studies:

Data pertaining to the correlation study of some important physiological and yield contributing characters with yield on pooled basis is given in Table 35. From the table it is clear that, among major morphological and physiological attributes, total dry matter, net assimilation rate, rate of photosynthesis, chlorophyll stability index, water use efficiency, carbon use efficiency, number of pods per plant, number of seeds per pod and harvest index had positive correlation with seed yield/plant. Among these parameters, a significantly highest positive correlation with seed yield/plant was exhibited by net assimilation rate (0.773) followed by harvest index (0.394). This may be due to the better carbon assimilation and translocation efficiency and also tend to have greater efficiency for better partitioning of photoassimilates towards reproductive growth in order to have better yield. Whereas negative but non-significant correlation with seed yield/plant was exhibited by rate of transpiration (-0.156) followed by plant height (-0.146).

Rate of transpiration was found negatively correlated with all the morphological, physiological and yield contributing parameters. The rate of photosynthesis also showed negative correlation with transpiration. The significantly highest positive correlation of photosynthesis was observed with water use efficiency (0.617) followed by harvest index (0.366), total dry matter (0.348) and chlorophyll stability index (0.312).

These results are in accordance with those coated by Gadakh S. (2014), Kambale S. (2015), Ambekar S. (2015) and Gondhalekar P. (2013) in lablab while Nigade (2015) in peanut genotypes.

#### Conclusion:

The present study will be useful for pulse breeders/ researchers/biotechnologist/ students for utilization of different promising thermo-tolerant lablab bean genotypes for further genetic improvement under changing climatic scenario.

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## कृत्रिम बुद्धिमत्तेचा कापड उद्योगांमध्ये वापर— एक अभ्यास

प्रा.चंद्रकांत भारसकळे

सहाय्यक प्राध्यापक

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#### सारांश

आज कृत्रिम बुद्धिमत्तेच्या वापरामुळे जगामध्ये क्षणाक्षणाला बदल होताना दिसत आहे. कृत्रिम बुद्धिमत्तेने प्रत्येक क्षेत्र व्यापलेले आहे. कृत्रिम बुद्धिमत्तेचा वापर हा उत्पादन व सेवा क्षेत्रामध्ये केला जातो. संशोधनासाठी संशोधकांनी दुय्यम माहिती पद्धतीचा वापर केलेला आहे. कापड उद्योगांमध्ये कृत्रिम बुद्धिमत्तेच्या सहाय्याने चांगल्या पद्धतीचे उत्पादन कमी खर्चामध्ये, कमी वेळेमध्ये, कमी श्रमाच्या सहाय्याने होत आहे. हे या संशोधना मधून मांडण्याचा प्रयत्न केला आहे. कापड उद्योगात नवीन तंत्रज्ञानाचा वापर वाढत आहे. व्यवसायात तंत्रज्ञानाचा वापर सोशल मीडियाच्या व्यवस्थापनापासून ते त्यामध्ये सुधारणा करण्यापर्यंत विविध प्रकारे केला जात आहे. कंपन्या ओपन एआय(व्चमद) किंवा आयबीएम(फंड) सारखे ऑप्शन वापरून कृत्रिम बुद्धिमत्तेचा उपयोग करू शकतात. ज्यामुळे उत्पादन क्षमता आणि गुणवत्ता सुधारते. कृत्रिम बुद्धिमत्तेमध्ये आयओटी(प्वज) आणि मशीन लर्निंग यासारख्या तंत्रज्ञानाचा वापर करून कापड उद्योग अधिक स्पर्धात्मक तसेच फायदेशीर ही ठरत आहे. विविध उत्पादने आणि सेवांचा फायदा घेण्यासाठी व्यापक बाजारपेठेतील शक्यता ओळखण्यास कृत्रिम बुद्धिमत्तेचा वापर केला

जातो. कृत्रिम बुद्धिमत्तेच्या मदतीने कापड गिरणीमध्ये रोबोट मशीन्सची संख्या वाढवली तर, व्यवसायात उत्तम व मोठ्या प्रमाणात उत्पादन निर्माण होईल, त्यास जास्त वेळही लागणार नाही. कामगारांची संख्या कमी केली असता होणारा पगारांवरील खर्च ही कमी होईल. सदर संशोधन पेपरद्वारे कापड उद्योग क्षेत्रात कृत्रिम बुद्धिमत्तेचा वापर कसा व कोणत्या कारणा साठी केला जातो याचा अभ्यास केला आहे.

**Keyword:** कापड उद्योग, कृत्रिम बुद्धिमत्ता, उद्योजकता.  
**प्रास्ताविक**

विज्ञान व तंत्रज्ञानामुळे अवघे जगच बदलून गेलेले आहे. यामध्ये कृत्रिम बुद्धिमत्तेचा महत्त्वपूर्ण हिस्सा आहे. आज कृत्रिम बुद्धिमत्तेच्या वापरामुळे जगामध्ये क्षणाक्षणांला बदल होताना दिसत आहे. कृत्रिम बुद्धिमत्तेने उत्पादन व सेवा या दोन्ही क्षेत्रांमध्ये शिरकाव केला आहे. सेवा क्षेत्रांमध्ये वित्तीय, शेती, विपणन, संशोधन, किरकोळ व्यापार आणि आरोग्य इत्यादी क्षेत्रांचा समावेश होतो. तर उत्पादन क्षेत्रात मोटार कारनिर्मिती, मोबाईल, औषध, हायपरलूप इत्यादी क्षेत्रांचा समावेश होतो.

वित्तीय (गुंतवणुकी बाबत विश्वासाह सल्ला, जास्त कार्यक्षम व पेपरलेस पद्धत, सुधारलेली वित्तीय सुरक्षा), अकाउंटिंग (डॉक्युमेंट रीडिंग रेकॉर्ड कीपिंग), शेती क्षेत्रात (रोबोट्स, स्वयंचलित ट्रॅक्टर्स) विपणन (सर्वोत्तम ग्राहक सेवा, ग्राहक विषयी माहिती व विश्लेषण, स्पर्धाविषयी माहिती व विश्लेषण आणि जाहिरातीचे वैयक्तिकीकरण), आरोग्य (अनुवर्षिक आजार, रोबोटिक सर्जरी आणि हृदयविकाराची झटक्याचे पूर्वनिदान) या क्षेत्रात केला जातो.

जगातील नामांकित कंपन्यांद्वारे कृत्रिम बुद्धिमत्तेचा वापर केला जात आहे. यामध्ये गुगल (गुगल सेल्फ ड्रायव्हिंग कार्स, गुगल पिक्सल बर्ड्स, गुगल सर्च, गुगल असिस्टंट, गुगल ट्रान्सलेट, गुगल फोटोज, युटूब, फेसबुक) मायक्रोसॉफ्टला, टेस्ला फोर्ड, सिमेन्स, जनरल इलेक्ट्रिक्स या कंपन्यांचा समावेश होतो. याचबरोबर स्मार्टफोन, स्मार्टवॉच, शिक्षण, मच्छीमार, पर्यटन आणि भाषांतर क्षेत्रांमध्ये ही कृत्रिम बुद्धिमत्तेचा वापर केला जातो.

**संशोधनाची उद्दिष्टे**

सदर संशोधनासाठी संशोधकांनी खालील उद्दिष्टे निर्धारित केलेली आहे.

१. कापड उद्योगांमधील कृत्रिम बुद्धिमत्तेच्या वापराबाबतचा अभ्यास करणे .
२. कापड उद्योगांमध्ये कृत्रिम बुद्धिमत्तेचा वापर केल्याने निर्माण होणाऱ्या मर्यादांचा अभ्यास करणे.

### **संशोधन पद्धती**

प्रस्तुत संशोधनासाठी संशोधकांनी दुय्यम माहिती पद्धतीचा वापर केलेला आहे. विषयाशी संबंधित माहिती प्राप्त करण्यासाठी संदर्भ ग्रंथ, पुस्तके, वृत्तपत्र, मासिके आणि इंटरनेटचा वापर करण्यात आलेला आहे.

### **माहिती व त्याचे विश्लेषण**

भारतामध्ये कृत्रिम बुद्धिमत्तेचा वापर जवळपास सर्वच क्षेत्रांमध्ये मोठ्या प्रमाणात होत आहे. कापड उद्योगांमध्ये कृत्रिम बुद्धिमत्तेचा वापर कशा पद्धतीने परिणाम घडवून आणेल याची ओळख या संशोधनातून सांगण्यात येत आहे. कापड उद्योगांमध्ये कृत्रिम बुद्धिमत्तेच्या सहाय्याने चांगल्या पद्धतीचे उत्पादन कमी, खर्चामध्ये, कमी वेळेमध्ये, कमी श्रमाच्या सहाय्याने करता येईल. आज प्रगत देशातील कारखान्यांमध्ये कामगारांपेक्षा रोबोटचे प्रमाण जास्त आहे. आज रोबोट सामान उचलणे, सामानाची देवाण-घेवाण करणे, उत्पादन करण्यासाठी मदत करणे, रेकॉर्डचे जतन करणे, अकाउंट बघणे अशी विविध प्रकारची कामे करतात. आजच्या रोबोट्सना एका विभागातून दुसऱ्या विभागात वस्तू सहजतेने हलवतात व तेही फारच अचूकतेने. पूर्वी रोबोटद्वारे कामगारांच्या जीवाला धोका होऊ नये म्हणून त्यांना बंदिस्त ठिकाणी कामे दिली जात होती, आता मात्र कामगारांच्या बरोबरीने कृत्रिम बुद्धिमत्ता (रोबोट्स) काम करतात. कापड उद्योगांमध्ये विकास करण्यासाठी कृत्रिम बुद्धिमत्तेच्या सहाय्याने चांगल्या पद्धतीने विकास व वाढ होऊ शकते हे या संशोधना मधून मांडण्याचा प्रयत्न केला आहे.

### **कापड उद्योग :**

कापड हा उद्योग प्रामुख्याने धागा, कापडनिर्मिती, कपड्यांचे डिझाईन व त्यांच्या उत्पादन आणि वितरणाशी संबंधित आहे. भारतातील कापड उद्योग हा पारंपारिकपणे शेतीनंतर आधारित असा उद्योग आहे, ज्याने कापड

क्षेत्रात कुशल आणि अकुशल कामगारांसाठी प्रचंड रोजगार निर्माण केला आहे. कापड उद्योग हे भारतातील दुसऱ्या क्रमांकाचे सर्वात मोठे रोजगार निर्माण करणारे क्षेत्र आहे. कापड उद्योग हे देशातील द्विं दशलक्षाहून अधिक लोकांना प्रत्यक्ष रोजगार देते. वस्त्रोद्योग मंत्रालयाच्या मते, संपूर्ण भारतात ह्यह्य्य कापड विणण्याचे कारखाने आहेत, आणि † घट्टि कापड फिनिशिंग कारखाने आहेत. जागतिक ताग उत्पादनात भारत पहिल्या स्थानावर आहे आणि जागतिक कापडाचा बाजारपेठेत <sup>^</sup> <sup>††</sup> हिस्सा भारताचा आहे. जागतिक कापड उत्पादनात भारत दुसऱ्या क्रमांकावर आहे. रेशीम आणि कापूस उत्पादनात ही दुसऱ्या क्रमांकावर आहे. महाराष्ट्रातही कापड उद्योग खूप प्रसिद्ध आहे विशेषता मुंबई, पुणे, इचलकरंजी, मालेगाव आणि नागपूर यासारख्या शहरांमध्ये कापडाच्या गिरण्या कार्यरत आहेत. त्यामध्ये विविध प्रकारचे कापड उद्योग आहेत ते पुढीलप्रमाणे

#### १) सूत कताई आणि विणकाम करणे —

सूतकताई म्हणजे फायबरपासून सूत तयार करणे तर विणकाम म्हणजे सूतून कापड तयार करणे. हे दोन्ही पारंपारिक कारागिरीचे क्षेत्र आहेत. यामध्ये कापसापासून सूत तयार करणे आणि कापडामध्ये रूपांतर करणे हे कार्य चालते.

#### २) गारमेंट उत्पादन —

कापडाचे उत्पादन झाल्यावर ते पुढील प्रकीयेसाठी पाठविण्यात येते, म्हणजेच तिथे कापड वापरून कपडे तयार केली जातात, यामध्ये कपडे तयार करण्याची प्रकिया चालते. यामध्ये टी—शर्ट, पॅन्ट, ड्रेस इत्यादी अनेक प्रकारचे कपडे तयार करण्याचा यामध्ये समावेश होतो. या उत्पादन प्रकीयेमध्ये अकुशल ,अर्धकुशल व कुशल कामगारांची आवश्यकता असते.

#### ३) हातमाग आणि यंत्रमाग —

हातमाग ही कापड विणण्याची पारंपारिक पद्धत आहे, ज्यामध्ये हाताच्या मदतीने कापड विणले जाते. यंत्रमाग ही कापड विणण्याची आधुनिक पद्धत आहे, ज्यामध्ये यंत्रांचा वापर करून कापड विणले जाते. महाराष्ट्रातील माधवनगर, सांगली भागामध्ये हातमागावर कापड बनविण्याची छोटे व मध्यम उपकरणे असल्याचे

दिसून येते.

#### ४) कृत्रिम तंतू उद्योग —

सर्वसाधारणपणे, सिंथेटिक तंतू स्पिनरेट्सद्वारे फायबर—फॉर्मिंग सामग्री बाहेर काढून फायबर बनवून तयार केले जातात. त्यांना 'कृत्रिम तंतू' म्हणतात. कृत्रिम तंतू उद्योगामध्ये नायलॉन, पॉलिस्टर, रेयॉन यासारख्या कृत्रिम तंतूचे उत्पादन केले जाते.

#### कापड उद्योगामध्ये कृत्रिम बुद्धिमत्तेचा वापर दृ महत्व

#### १. रोजगार निर्मिती —

पूर्वी कापड उद्योगांमध्ये कामगारांची गरज जास्त असायची, त्यामुळे व्यवसायिकांना उत्पादन करण्यासाठी जास्त खर्च करावा लागत होता. कृत्रिम बुद्धिमत्तेमुळे तज्ञ कुशल, शिक्षित कामगारांना नोकरीवर ठेवून उत्तम उत्पादन तेही कमी वेळेत करता येते. कापड उद्योगामुळे लाखो लोकांना प्रत्यक्ष आणि अप्रत्यक्षपणे रोजगार मिळतो. यामध्ये तज्ञ व डिजाइनर्सद्वारे कृत्रिम बुद्धिमत्तेचा वापर करून व्यवसायामध्ये अधिक उत्पादन केले जाते, तसेच अर्धकुशल आणि अकुशल कामगारांना ही व्यवसायामध्ये कृत्रिम बुद्धिमत्ता उत्तम काम करण्याची संधी निर्माण करते.

#### २. निर्यात आणि परकीय चलन —

भारताच्या अर्थव्यवस्थेमध्ये उद्योगांचा फार मोठा वाटा आहे. भारतातील उत्पादित वस्तू आंतरराष्ट्रीय बाजारपेठेमध्ये मोठ्या प्रमाणात विकले जातात. यामध्ये कापड उद्योगाचा ही समावेश होतो. भारतातील तसेच महाराष्ट्रातील कापड उत्पादन हे जगभरात निर्यात केला जातो, यामुळे देशाला परकीय चलन मिळते आणि अर्थव्यवस्था मजबूत होण्यास मदत करते.

#### ३. ग्रामीण विकास —

ग्रामीण भागामध्ये अकुशल आणि अर्धकुशल लोकांचे प्रमाण मोठ्या प्रमाणात असते. तसेच त्यांच्यामध्ये बेरोजगारीचे हे प्रमाण अधिक असते. कापड उद्योगामुळे बेरोजगार लोकांना काम करण्यास संधी निर्माण होते, कारण हे काम एका मोठ्या कारखान्यांमध्ये किंवा गिरणीमध्ये असते, जास्त अवघड ही नसते. लगेच कामगारांना त्याची प्रकिया लक्षात येते. कापड उद्योग व्यवसायांमुळे ग्रामीण भागातील लोकांना रोजगार मिळते,

यामुळे ग्रामीण अर्थव्यवस्था सुधारते.

#### ४. स्त्रियांना मोठ्या प्रमाणात महत्त्व आणि फायदा—

कापड गिरण्यांमध्ये पुरुषांच्यापेक्षा महिलांची संख्या ही मुख्यता गारमेंट सेक्शनमध्ये कार्यरत असते. त्यामध्ये किमान ५० कामगार महिला वर्गच असतो. ग्रामीण भागातील स्त्रियांना आपल्या परिस्थितीमुळे रोजगाराची गरज भासते, त्यामुळे त्या कोठेही काम करण्यास तयार असतात. कापड उद्योगामुळे त्यांना कायमस्वरूपी रोजगार मिळते. कापड उद्योगात मोठ्या प्रमाणात महिलांना रोजगार मिळतो. ज्यामुळे त्यांचे सामाजिक आणि आर्थिक सक्षमीकरण होते. त्यामुळे प्रत्येक स्त्रीला स्वतः जगण्यासाठी स्व-सामर्थ्य निर्माण होते.

#### ५. तंत्रज्ञान विकास —

कापड उद्योगात नवीन तंत्रज्ञानाचा वापर वाढत आहे. ज्यामुळे उत्पादन क्षमता आणि गुणवत्ता सुधारते. एआय, आयओटी(प्वज) आणि मशीन लर्निंग यासारख्या तंत्रज्ञानाचा वापर करून कापड उद्योग अधिक स्पर्धात्मक तसेच फायदेशीर होऊ शकते.

#### कापड उद्योगांमध्ये कृत्रिम बुद्धिमत्तेचा वापर

कापड उद्योग गिरण्यांमध्ये सगळे काम मशीनद्वारे होत असले, तरीही तितकेच तिथे मानवी श्रमदानाची ही गरज भासते. कापड बनवण्याची प्रक्रिया फार वेळ खऊ असल्याने त्यामध्ये उत्पादनासाठी लागणारा खर्चही अधिक होतो. आधुनिक युगाच्या नजरेने विचार केला तर कृत्रिम बुद्धिमत्तेच्या मदतीने गिरणीमध्ये रोबोट मशीन्सची संख्या वाढवली तर, व्यवसायात उत्तम प्रकारचे उत्पादन निर्माण होईल. जास्त वेळही लागणार नाही. कामगारांची संख्या रोबोच्या वापरामुळे कमी होईल व पगारांवरील खर्च ही कमी करता येईल. कृत्रिम बुद्धिमत्तेचा कापड गिरणीमध्ये उपयोग पुढील प्रमाणे करता येईल

#### १) कापड उत्पादन परिणामकारक किंवा अनुकूल करणे :

गिरणी मध्ये कृत्रिम बुद्धिमत्तेचा वापर करून मटेरियल हाताळणे आणि कटिंग सारख्या कंटाळवाऱ्या कामांना स्वयंचलित करू शकतात, जेणेकरून अचूकता

सुधारेल आणि त्यामुळे उत्पादकता जास्त होईल आणि कमी चुका होतील.

#### २) रंगसंगती :

कृत्रिम बुद्धिमत्तेच्या मदतीने कापड बनविणाऱ्या कंपनी रंगसंगतीच्या सुत्री करणाऱ्या अचूकता सुधारू शकतात. कृत्रिम बुद्धिमत्तेचलीत प्रणाली रंग फिकट होण्याच्या अंदाज लावू शकतात. त्यामुळे व्यवसायांना रंगसंगतीच्या सुत्रीकरणाच्या समायोजना करण्यास सक्षम केले जाते. कृत्रिम बुद्धिमत्ता रंगसंग प्रक्रियेला देखील अनुकूलित करू शकते. ज्यामुळे पाणी आणि ऊर्जेचा वापरही कमी लागेल.

#### ३) गुणवत्ता नियंत्रित करून त्यातील दोष शोधते:

कापड गिरणीमध्ये/कारखान्यामध्ये कृत्रिम बुद्धिमत्तेचलित सेन्सर्स कॅमेरे आणि डस् अल्गोरिदम इत्यादी तंत्रे गुणवत्ता नियंत्रण प्रक्रियेची अचूकता आणि कार्यक्षमता सुधारू शकतात. कृत्रिम बुद्धिमत्ता छिद्रे, डाग आणि असमान शिलाई यासारखे दोष मानवी गुणवत्ता तंत्रज्ञानापेक्षा उच्च प्रमाणात ओळखू शकतील. यामुळे डिझायनर्स आणि शिवणकाम करणाऱ्या व्यक्तींना देखील यांचा मोठा फायदा होईल.

#### ४) पुरवठा साखळीतील जोखीम कमी करते :

उत्पादक मागणीचा अंदाज घेण्यासाठी उत्पादन वेळापत्रक पर्याप्त करण्यासाठी आणि योग्य वेळी साठा पातळी व्यवस्थित करण्यासाठी कृत्रिम बुद्धिमत्तेचलित प्रणाली पुरवठा साखळीतील जोखीम ओळखू शकतात. जोखमीचे प्रमाण हे अल्प, मध्यम व जास्त अशा स्वरूपात असते. अशावेळी, कृत्रिम बुद्धिमत्तेचा वापर केल्यामुळे जोखीम जास्त असल्यास त्वरित सुचवले जाते. त्याप्रमाणे उत्पादनामध्ये वाढ करता येते. परिणामी ग्राहकांना वस्तू/सेवांचा पुरवठा अखंडितपणे सुरू ठेवता येतो. याच बाबी मनुष्यबळाद्वारे काटेकोरपणे अथवा त्यांच्या दुर्लक्षपणामुळे त्वरित केल्या जात नाहीत.

#### ५) कपड्यांचे डिझाईन ठरवणे :

टेक्सटाईल डिझायनर्स नवीन नमुने, पोत आणि डिझाईन जलद आणि अधिक कार्यक्षमतेने तयार करण्यासाठी जनरेटर वापरू शकतात. ग्राहकांच्या पसंतीचे विश्लेषण करण्यासाठी देखील कृत्रिम बुद्धिमत्तेचा वापर

केला जाऊ शकतो. ज्यामुळे डिझायनर्स ग्राहकांना आकर्षित करण्याची शक्यता जास्त असलेल्या डिझाईन वापरून ग्राहकांना मोठ्या प्रमाणात आकर्षित करून व्यवसाय वाढीस मदत करू शकतात.

#### ६) ऊर्जा कार्यक्षमता :

कृत्रिम बुद्धिमत्ता कापड गिरण्यांमध्ये ऊर्जा वाया जात असलेल्या क्षेत्रांना ओळखून त्याचा अतिवापर कमी करण्यासाठी पावले उचलू शकते, यामुळे कंपनीला किंवा गिरणीला ऊर्जा कमी खर्च करण्यास ,त्यांचा पर्यावरणीय परिणाम कमी करण्यास व ऊर्जा नियमांचे पालन करण्यास मदत करते.

#### ७) उत्पादन यादीचे विश्लेषण करते :

कंपन्या विक्री डेटाचे विश्लेषण करण्यासाठी आणि भविष्यातील मागणीचा अंदाज घेण्यासाठी कृत्रिम बुद्धिमत्तेचा वापर करू शकतात. यामुळे अतिरिक्तून साठ्याच्या पातळी बदल अधिक माहिती पूर्ण निर्णय घेता येतील. ज्यामुळे स्टॉक आऊट आणि ओवर स्टॉक चा धोका कमी होईल. कापड कंपन्यांमध्ये कृत्रिम बुद्धिमत्तेचा वापर केल्याने हळू चालणार्या वस्तू ओळखण्यास मदत होऊ शकते. त्यामुळे त्यांना त्यांच्या साठा आणि वितरण धोरणांमध्ये समायोजना करता येतील.

#### ८) सुव्यवस्थित उत्पादन कार्यक्षमता :

कृत्रिम बुद्धिमत्तेचलीत स्वयंचलित कापड उत्पादन प्रक्रिया सुलभ करते. उपकरणांच्या आरोग्याचे निरीक्षण करून आणि भविष्य सूचक देखभालीद्वारे डाऊन टाईम कमी करून, कृत्रिम बुद्धिमत्तेमुळे उत्पादकता वाढवून त्याचे उत्पादन खर्चही कमी करता येते.

#### ९) वैयक्तिकीकरण करणे :

कृत्रिम बुद्धिमत्तेमुळे कापड उत्पादकांना वैयक्तिक ग्राहकांच्या आवडीनिवडी पूर्ण करता येतात. डिझाईन आणि रंगांच्या निवडीपासून ते आकार आणि फिटिंग पर्यंत कृत्रिम बुद्धिमत्ता चलित तंत्र वापरून आजच्या विवेकी ग्राहकांच्या मागण्या पूर्ण करून वैयक्तिकृत कपडांचे फॅशन तयार करण्यास मदत करते. कृत्रिम बुद्धिमत्तेमुळे कंपन्यांना ग्राहक ओळखणे अगदी सुलभ होते .

#### १०) डिझायनर्सना ही कृत्रिम बुद्धिमत्ता मदत करते :

कृत्रिम बुद्धिमत्तेचा डिझायनर्सना ही सर्जनशील कल्पना निर्माण करण्यास, नवीन साहित्य शोधण्यात आणि फॅशनचा अंदाज लावण्यास मदत करते. कृत्रिम बुद्धिमत्ता डिझाईन आणि नाविन्यपूर्ण चक्राला मदत करते.

#### ११) विपणन आणि विक्री :

कृत्रिम बुद्धिमत्तेमुळे ग्राहकांच्या वर्तनाचे विश्लेषण करून प्रभावी विपणन तयार करता येते. त्यामुळे ग्राहकांच्या आवडीनिवडीनुसार वस्तूंची विक्री करण्यासाठी मदत होऊ शकते.कृत्रिम बुद्धिमत्तेच्या मदतीने कोणत्या वस्तूला, कोणत्या बाजारपेठेत/ठिकाणी वस्तूची मागणी अधिक असेल याचाही शोध घेता येऊ शकते असे केल्यास व्यवसाय वाढण्यास ही मदत होते .

#### कापड उद्योगामध्ये कृत्रिम बुद्धिमत्ता वापरल्याने निर्माण होणाऱ्या मर्यादा

कृत्रिम बुद्धिमत्ता वाढत असताना व्यवसाय कंपन्या उत्पादकता, नफा आणि एकूण कामगिरी वाढवण्यासाठी कृत्रिम बुद्धिमत्तेचा अधिक वापर करत आहेत. याच्या वापरामुळे काही प्रमुख मर्यादा देखील आहेत, जे स्वीकारण्यापूर्वी विचारात घेतले पाहिजे —

#### १) डेटा गुणवत्ता आणि उपलब्धता —

कृत्रिम बुद्धिमत्ता स्वीकारण्यात सर्वात मोठे आव्हान म्हणजे खराब दर्जाचा डेटा. बऱ्याचदा डेटा खंडित ,विसंगत किंवा जुना असतो त्यामुळे व्यवसायांना कृत्रिम बुद्धिमत्तेचा प्रभावीपणे वापर करणे कठीण होते. व्यवसायांना कोणताही प्रकल्प सुरू करण्यापूर्वी, डेटा गोळा करण्यासाठी आणि व्यवस्थापन करण्यासाठी एक मजबूत डेटा व्यवस्थापन पद्धती आणि स्पष्ट धोरण आवश्यक असत. असे नसल्यास व्यवसाय तोट्यात/डबघाईत जाण्याची ही शक्यता असते. त्यामुळे कंपनीचा किंवा कारखान्याचा योग्य आणि अचूक डेटा कृत्रिम बुद्धिमत्ता वापरताना विचारात घेतला पाहिजे.

#### २) कौशल्याची कमतरता —

कृत्रिम बुद्धिमत्तेसाठी विशेष कौशल्यांची आवश्यकता असते. ज्याची मागणी जास्त असते. अनेक व्यवसायांना प्रणाली विकसित करण्यासाठी

आवश्यक असलेल्या डेटा सायंटिस्ट, मशीन लर्निंग, इंजिनियर आणि इतर तंत्र शोधण्यात अडचण येते. या कौशल्याची तफावत कृत्रिम बुद्धिमत्ता स्वीकारण्याची गती कमी करू शकते. त्यामुळे व्यवसायांना बाहेरील सल्लागारांवर अवलंबून राहावे लागते.

### ३) जास्त खर्च होतो —

कृत्रिम बुद्धिमत्ता तंत्रज्ञान महाग आहे. विशिष्ट ज्या व्यवसायामध्ये अंतर्गत कौशल्य नाही. त्यांच्यासाठी सुरुवातीच्या गुंतवणुकी व्यक्तिस्वरूप प्रशिक्षण सिस्टीम, देखभाल आणि सॉफ्टवेअर अपडेट साठी सतत खर्च येतो. सूक्ष्म व लघु उद्योगांना हे परवडणारे नाही. मध्यम उद्योगांना काही प्रमाणात तर मोठ्या उद्योगांना याच्या वापरापासून फायदा होऊ शकतो.

### ४) पायाभूत सुविधांसह एकीकरण —

कालबाह्य किंवा विसंगत पायाभूत सुविधा या तंत्रज्ञानाच्या अंमलबजावणीत अडथळा आणू शकतात. कृत्रिम बुद्धिमत्ता प्रणाली अनुप्रयोगांच्या प्रक्रिया मागणीला हाताळण्यास सक्षम असावे लागतात. एकात्मतेसाठी आणि योग्य वातावरण तयार करण्यासाठी हार्डवेअर आणि सॉफ्टवेअर अपग्रेड करणे समाविष्ट असू शकते.

### ५) सिस्टीम देखभाल —

कृत्रिम बुद्धिमत्ता सिस्टीम गुंतागुंतीचे असतात. ते प्रभावी राहण्यासाठी त्यांना नियमित अपडेटची आवश्यकता असते. जर काही चूक झाली, तर कृत्रिम बुद्धिमत्ता पुनर्संचयित करणे वेळ खराऊ आणि महाग असू शकते. जरी हे धोके सर्व सॉफ्टवेअर मध्ये अस्तित्वात असले तरी कृत्रिम बुद्धिमत्तेची जटिलता सिस्टीम बीघाडांचा परिणाम अधिक गंभीर बनवू शकते.

### ६) गोपनीयता आणि पारदर्शकतेची चिंता —

कृत्रिम बुद्धिमत्ता सिस्टीम अनेकदा संवेदनशील ग्राहक डेटा हाताळतात. त्यामुळे गोपनीयता आणि डेटा सुरक्षिततेबद्दल चिंता निर्माण होते. ज्या व्यतिरिक्त निर्णय घेण्याच्या प्रक्रिया स्पष्ट करणे कठीण असू शकते, ज्यामुळे गोपनीयता नियमांचे पालन करणे गुंतागुंतीचे होऊ शकते त्यामुळे व्यवसाय कमी पारदर्शक बनू शकतात.

### व्यवसायामध्ये कृत्रिम बुद्धिमत्तेचा उपयोग

व्यवसायासाठी सिस्टीम मध्ये चॅट बॉट्स पासून

ते बिजनेस इंटेलिजन्स टूल्स पर्यंत विविध प्रकार आहेत. व्यवसाय तंत्रज्ञानाचा वापर व्यवसायिक सोशल मीडियाच्या व्यवस्थापनपासून ते त्यामध्ये सुधारणा करण्यापर्यंत विविध प्रकारे करत आहेत. कंपन्या 'ओपन एआय'(व्हामद.ए) आणि 'आयबीएम'(एचड) सारखे ऑप्शनस वापरून कृत्रिम बुद्धिमत्तेचा उपयोग करू शकतात. 'एक्स' सारख्या कंपन्यांची भागीदारी करून किंवा त्यांच्या सेवांची सदस्यता घेऊन या फायद्यांचा लाभ घेऊ शकतात. टेस्लासारख्या प्रधात्यांकडून अनेक 'ऑफ द सेल्फ' कृत्रिम बुद्धिमत्तेचालित प्लॅटफॉर्म देखील आहेत. यांचा उपयोग व्यवसायिक करू शकतात.

### समारोह / निष्कर्ष

जगभरातील प्रगत देशात उत्पादन व सेवा उद्योग यामध्ये मोठ्या प्रमाणात कृत्रिम बुद्धिमत्ता या संकल्पनेचा वापर होत आहे. तरी कृत्रिम बुद्धिमत्तेची भूमिका अलीकडील काळात अधिक महत्वाची आहे. यामध्ये विविध प्रकारचे उत्पादन केले जाते. कापड उद्योगांमध्ये कृत्रिम बुद्धिमत्तेचा वापर उत्तम प्रकारचे उत्पादन निर्माण करण्यासाठी, त्याच पद्धतीने गुणवत्ता नियंत्रित करण्यासाठी, कार्यक्षमता वाढवणे आणि उत्पादनाचे विपणन आणि विक्री करण्यासाठी होतो. व्यवसायामध्ये कार्यक्षमता वाढवणे हे या कृत्रिम बुद्धिमत्तेच्या सहाय्याने होत आहे. कृत्रिम बुद्धिमत्तेमुळे व्यवसायिक क्षेत्रामध्ये ज्या पद्धतीने वाढ होत आहे, त्याच पद्धतीने त्याच्या काही मर्यादा देखील आहेत. हे संशोधनाद्वारे स्पष्ट केले आहे.

### संदर्भ सूची:

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