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VISION OF THE MILLENNIUM INDIA 2047: ROLE OF HUMANITIES, SCIENCE & COMMERCE

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RAJMATA JIJAU MAHAVIDYALAYA KILLE-DHARUR, DIST. BEED, MS

Good Wishes Message

Hon. Shri Prakash Dada Solunke
President, Marathwada Shikshan Prasarak Mandal, Chhatrapati Sambhajinagar

It gives me immense pleasure to express my heartfelt greetings to Rajmata Jijau Mahavidyalaya, Kille Dharur, for organizing the One Day National Conference on 6 February 2026 under the guidance of Marathwada Shikshan Prasarak Mandal, Chhatrapati Sambhajinagar. Academic conferences of this nature play a vital role in nurturing intellectual curiosity, promoting research culture, and strengthening the academic ecosystem of higher education institutions.

In the present era of rapid transformation, the theme "Vision of the Millennium – India 2047: Role of Science, Humanities and Commerce" is both timely and inspiring. The future of India depends not only on technological advancement but also on ethical values, social awareness, and economic innovation. By integrating science, humanities, and commerce, this conference creates a meaningful platform for holistic thinking and national development.

I am delighted to note that the conference has received an overwhelming response with more than 215 research papers submitted from across India. Such enthusiastic participation demonstrates the growing commitment of academicians and researchers toward quality research and knowledge creation. These scholarly contributions will generate academic awareness, encourage innovative approaches, and address contemporary challenges relevant to society and the nation.

The presence of distinguished guests such as the Honorable Vice-Chancellor Dr. Valmik Sarvade of Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar, and keynote speaker Dr. Anurag Shrivastava, Indore, will certainly add intellectual value to the conference proceedings. Their guidance will inspire young researchers and faculty members to pursue excellence in teaching and research.

Such national-level academic forums provide participants with opportunities for professional growth, networking, and collaborative research. They help scholars broaden perspectives, share best practices, and build confidence in presenting innovative ideas at a wider platform.

Marathwada Shikshan Prasarak Mandal has always emphasized academic quality, social responsibility, and research-oriented education. The efforts of the Principal, organizing committee, coordinators, faculty members, and staff of Rajmata Jijau Mahavidyalaya, Kille Dharur, deserve special appreciation for their dedication and teamwork in making this event possible.

I extend my sincere congratulations to all contributors, researchers, and participants for their valuable involvement. I am confident that this conference will be academically fruitful and will contribute meaningfully to the vision of a progressive and developed India.

I wish the One Day National Conference a grand success.

<center>**Good Wishes Message**</center>

Hon. Satish Bhau Chavan
Secretary, Marathwada Shikshan Prasarak Mandal, Chhatrapati Sambhajinagar

The One Day National Conference organized by Rajmata Jijau Mahavidyalaya, Kille Dharur, under the aegis of Marathwada Shikshan Prasarak Mandal, Chhatrapati Sambhajinagar, scheduled on 6 February 2026, is a significant academic initiative aimed at strengthening research culture and intellectual engagement in higher education. Such national-level platforms encourage scholars and academicians to exchange ideas, promote innovation, and contribute meaningfully to the academic community. I sincerely appreciate the efforts of the organizing committee for undertaking this valuable initiative.

As India progresses towards the vision of a Developed India 2047, the theme "Vision of the Millennium – India 2047: Role of Science, Humanities and Commerce" is highly relevant and forward-looking. The integration of scientific research, human values from humanities, and innovative practices in commerce is essential for holistic national development. This conference provides an appropriate platform for interdisciplinary dialogue and critical reflection, which will help shape future academic and social perspectives.

The conference has received an impressive response from across the country, with more than 215 research papers submitted from different states of India. This enthusiastic participation reflects the national recognition of the conference and the commitment of researchers toward academic excellence. These contributions will enhance academic awareness and stimulate innovation in research by addressing contemporary issues, opportunities, and solutions relevant to nation-building.

The presence and guidance of the Honorable Vice-Chancellor Dr. Valmik Sarvade, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar, and the keynote speaker Dr. Anurag Shrivastava, Indore, will certainly inspire the participants and enrich the intellectual environment of the conference. Their experiences and insights will motivate young researchers and faculty members to pursue quality research with a broader vision.

Participation in this national conference will provide scholars, teachers, and researchers with opportunities for academic networking, professional development, and the exchange of innovative ideas. Such platforms help in building confidence, strengthening research skills, and creating meaningful academic collaborations at the national level.

Marathwada Shikshan Prasarak Mandal has always been committed to promoting quality education, research, and social responsibility. The initiative taken by Rajmata Jijau Mahavidyalaya, Kille Dharur, reflects this vision and dedication. I congratulate the Principal, organizing committee, faculty members, and staff for their sincere efforts.

I extend my best wishes to all the dignitaries, researchers, faculty members, and participants for the grand success of this One Day National Conference. May this academic gathering contribute significantly to knowledge creation and the vision of a progressive and developed India.

Message from the Principal & Organising Chief

It is a matter of great pride and pleasure for me to welcome all the delegates, academicians, researchers, and participants to the One Day National Conference organized on 6 February 2026 at Rajmata Jijau Mahavidyalaya, Kille Dharur, under the aegis of Marathwada Shikshan Prasarak Mandal, Chhatrapati Sambhajinagar.

In today's knowledge-driven world, academic institutions must move beyond traditional teaching and actively promote research, innovation, and interdisciplinary dialogue. The theme "Vision of the Millennium – India 2047: Role of Science, Humanities and Commerce" reflects the nation's aspiration to build a progressive, inclusive, and globally competitive India. This conference provides a meaningful platform to deliberate on how education, research, and social responsibility can collectively shape the future of our country.

I am pleased to note that this conference has received an overwhelming response with more than 215 research papers from across India. Such enthusiastic participation highlights the strong research culture among scholars and faculty members. These contributions will certainly generate academic awareness, promote innovative thinking, and provide solutions to emerging challenges in education, economy, and society.

The presence of eminent dignitaries like Hon'ble Vice-Chancellor Dr. Valmik Sarvade, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar, and keynote speaker Dr. Anurag Shrivastava, Indore, will enrich the intellectual environment of this conference. Their insights and experiences will motivate young researchers to pursue excellence in scholarship and professional development.

This national conference is not merely an academic event but a platform for collaboration, networking, and exchange of ideas among researchers from diverse disciplines. It encourages participants to broaden perspectives, strengthen research skills, and contribute meaningfully to national development.

Hon. Shri Prakash Dada Solunke, President, and Hon. Shri Satish Bhau Chavan, Secretary, Marathwada Shikshan Prasarak Mandal, deserve special appreciation for their visionary leadership, continuous encouragement, and strong institutional support that made this national academic initiative possible.

I would also like to place on record my special appreciation for Prof. Dr. Indrajeet Ramdas Bhagat for his visionary initiatives and untiring efforts in conceptualizing, coordinating, and strengthening the academic framework of this conference. His dedicated role in organizing the event and ensuring the quality publication of research papers has significantly contributed to the scholarly value and national visibility of this programme.

I also appreciate the committed efforts of the organizing committee, coordinators, editors, faculty members, non-teaching staff, and student volunteers whose teamwork has made this event possible.

I extend my best wishes to all presenters, participants, and organizers. I am confident that this One Day National Conference will be academically rewarding and will leave a lasting impact on research, innovation, and institutional growth.

With warm regards and best wishes for the grand success of the conference.

Dr. Gopal Kakade
Principal & Organising Chief
Rajmata Jijau Mahavidyalaya, Kille Dharur

Massage from Editor's Desk

It gives me immense pleasure to share my thoughts on the occasion of the One Day National Conference organized by Rajmata Jijau Mahavidyalaya, Kille Dharur, under the aegis of Marathwada Shikshan Prasarak Mandal, Chhatrapati Sambhajinagar. The successful conceptualization of this conference has been possible because of the constant support and encouragement of the Honorable President Shri Prakash Dada Solunke, the respected Secretary Shri Satish Bhau Chavan, the members of the Local Management Committee, the Principal Dr. Gopal Kakade, Vice Principals Dr. Milind Gaikwad and Prof. Dr. Mahadev Jogade, Head of the English Department Dr. Balaji Navale, and all my esteemed colleague faculty members. Their guidance, cooperation, and confidence have played a vital role in shaping this national-level academic initiative.

This conference has received an overwhelming response from across India, with more than 215 research papers and academic contributions submitted by scholars, teachers, and researchers from different states. Such enthusiastic participation itself reflects the academic credibility and national relevance of this conference. These papers will certainly enhance academic awareness and encourage innovation in research by presenting new ideas, contemporary issues, and practical solutions relevant to national development.

As the Editor of the Conference Proceedings, I feel honoured to undertake the responsibility of editing, reviewing, organizing, and publishing all the research papers received for this conference. My sincere effort is to ensure that every contribution is presented in a systematic, high-quality, and academically meaningful form so that the work of researchers reaches a wider scholarly community. Research is not merely documentation; it is a process of knowledge creation that contributes to society, education, and nation-building. With this perspective, the editorial and publication work is being carried out with due care, academic integrity, and professionalism.

I extend my heartfelt congratulations to all the participating professors, researchers, academicians, and contributors who have responded positively to this national conference. Through your scholarly writings, you have strengthened the culture of research and intellectual dialogue. The ideas presented through these papers will be useful in shaping future academic policies, curriculum development, and research directions.

National conferences such as this provide a platform for confidence building, exchange of ideas, interdisciplinary interaction, and professional collaboration. The response received for this one-day national conference is truly encouraging and will inspire the organization of many more meaningful academic activities in the future.

Finally, I once again congratulate all researchers, faculty members, and organizers associated with this conference and convey my best wishes for their continued academic growth and success.

Dr. Indrajeet Ramdas Bhagat
Chief Editor and Conference Director
Professor, Commerce & Management
Rajmata Jijau Mahavidyalaya, Kille Dharur

TABLE OF CONTENT

TheB-Diketone1-(4-Methylthiophen-2-yl)-3-(2,4-dihydroxyphenyl) Propane 1,3 Dione form Complex With Transition Metal Ions Ni(II), Co (II) and study of Stability Constant by Potentiometric Technique

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Abstract:

The study of stability constant of b-diketone 1-(4-methylthiophen-2-yl)-3-(2,4dihydroxyphenyl) -propane 1,3 dione[L4] with metal ion form complex with Ni(II) and Co (II) have been studied at 0.1 M ionic Strength at RT. Potentiometricaly in aqueous media by titrating with standard NaOH solution. The complexes formation between Ni(II) and Co (II) metal ions Hence it is observed that Nickel, Cobalt metal ions formed 1:1 and 1:2 complexes with b-diketone ligands (L). The observed values were comparing with the values of pH and metal-ligand stability constants and dissociate constant.

Keywords: Potentiometric Study, B–Diketone, Stability Constant, pH values

Introduction:

β-diketone containing Metal complexes can be studied, because β-diketone has good synthetic flexibility[1], sensitivity towards the central transition metal ion of metal complexes and selectivity. Potentiometric studies of various binary complexes formed with different transition metal ions [2]. The transition metal complexes used for preparation of metallic compounds [3] and as a catalyst in organic synthesis reaction.

The metal complexes of β-diketones (L) derivatives of Nickel, Cobalt metal ions [4] stability constant compare with other metal complexes [5]. β-diketone and their metal complexes used in various areas because of their unique structural features[6], chemical functionalities, and toughness to light and heat as electroluminescence materials [7].β-diketones importance as good ligands [8].

The β-diketone 1-(4-methylthiophen-2-yl)-3-(2,4dihydroxyphenyl) -propane 1,3 dione[L4] was prepared by using 2,4-dihydroxyacetophenone and 4-methylthiophene-2-carboxylic acid at RT & this β-diketone 1-(4-methylthiophen-2-yl)-3-(2,4dihydroxyphenyl) -propane 1,3 dione[L4] reacts with metal ions like Ni(II) Co (II) to form Metal complexes. In the preparation of transition metal complexes less use of β-diketone.[9] so to synthesis of some β-diketone derivatives as a ligand and prepare their Ni(II) Co (II) complexes.

Materials And Method:

[A] Synthesis of 2-acetyl-5-hydroxyphenyl 4-methylthiophene-2-carboxylate

The compound 2,4 dihydroxyacetophenone of 1.53 gm and 1.43 gm of 4-methythiophene-2-carboxylic acid add a 4 ml pyridine and $POCl_3$ slowly with drop wise manner and stir continuously at very low temperature at 0ºC this reaction material stirred about 5-6 hours and this will be checked and monitor by Thin Layer Chromatography technique obtained produce is recrystallized by using a ethanol solution again

filter this and dried in oven yield is 85% and M.P.   is 173 °C
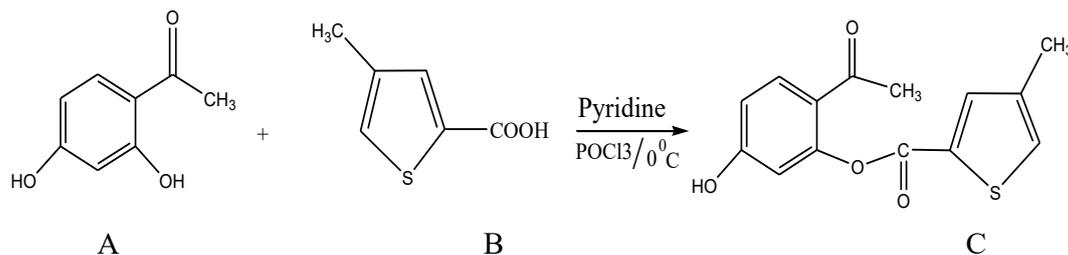
A = (2,4 dihydroxy- acetophenone)

B = (4-methylthiophene-2-carboxylic acid)

C   =   2-acetyl-5-hydroxyphenyl-4-methylthiophene-2-carboxylate)

Synthesis   of   2-acetyl-5-hydroxyphenyl-4-methylthiophene-2-carboxylate

[B] Synthesis of 1(4-methylthiophen-2-yl)3(2,4dihydroxyphenyl)-propane 1,3-dione:

2-acetyl-5-hydroxyphenyl-4-methylthiophene-2-carboxylate Compound take

2.77gm compound are added in pyridine and dissolve the compound and this mixture of compounds are added in a potassium hydroxide solution and this mixture of reaction is stirred continuously about 2-3 hours and this will be checked by Thin Layer Chromatography technique. obtained solid is of yellow colored compounds is recrystallized using a pure alcohol and take a weight and melting point of obtained product yield is 78% and M.P. is 278 °C

A   =   (2-acetyl-5-hydroxyphenyl-4-methylthiophene-2-carboxylate)

B   =   (1-(4-methylthiophen-2-yl)3(3,4-dihydroxyphenyl)-propane 1,3- dione)

Synthesis of β-diketone ligand

1.Characterization Of Ligands: The structural features of obtained ligand 1-(4-methylthiophen-2-yl)-3-(2,4dihydroxyphenyl) propane 1,3 dione[L4] was scanned for IR, 1H NMR, 13 C-NMR and UV/Visible spectroscopy. This elucidated with the help of elemental analysis. Synthesized ligand was stable to air and moisture ligand soluble in ethanol, methanol, but insoluble in water and ether [12]. Following are the scanning results given below.

FT-IR (KBr) cm^{-1}: 3087(=C-H), 3141(Ar-C-H), 1585(C=C), 678(C-S), 3361(Ar-O-H),1637 (C=O),1235(C-O),

^{1}H-NMR (300MHz, CDCl$_3$-d6); δ =7.47 (d, 1H, Ar-H), 6.48 (d, 1H, Ar-H), 6.39 (s, 1H, Ar-H), 7.6(s,1H, H—═),   7.44 (d, 1H, Thioph-H), 7.17(d, 1H, Thioph-H), 5.0(s, 2H, -OH), 15.0(s, 1H, Enolic-OH), 2.21(s,3H,- CH$_3$) .

^{13}C-NMR (300MHZ,CDCl$_3$);δ=   189.7(s,C-1,C=O),   99.0(d,C-2,-CH=),   195.5(s,C-3), 115.3(s,C-1'),   163.2(s,C-2'),   104.1(d,C-3'), 165.7(s,C-4'),   109.0(d,C-5'),   132.7(d,C-6'), 136(s,C-2''),   127.6(d,C-3''),   138(s,C-4''), 126.7(d,C-5''), 18.5(q,C-1''')

UV/Vis(DMSO)nm: 360,410

Elemental analysis : C, 60.86; H, 4.38; O, 23.16; S, 11.60

2.Potentiometric titration of β-diketone [L] with metal ion M(II):

[M= Co ,Ni]:

The B-diketone L4 and metal-ion Co (II) titration:

The sodium hydroxide is standardized by using acid solution i.e. oxalic acid and the potentiometeric titrations. The solutions like potassium nitrate, acid, metal-ion and sodium hydroxide was prepared using pure water i.e. distilled water and the conductivity and pH is 1.60×10^{-6} mhos and 6.7. And The above mixture of ligand L4 and copper sulphate is added in

ethanol i.e. 5.61 gm and 2.17 gm respectively. And this will be titrating against sodium hydroxide with constant shaking.

1. Free (0.02M) HNO_3 [A]
2. Free (0.02M) HNO_3 + (0.02M) Ligand [A+L4]
3. Free (0.02M) HNO_3 + (0.02M) Ligand + (0.01M) Metal ion [A+L4+ Co (II)]

The obtained readings were ploted NaOH against Emf and calculate pH and determined the dissociation and stability constant.

A
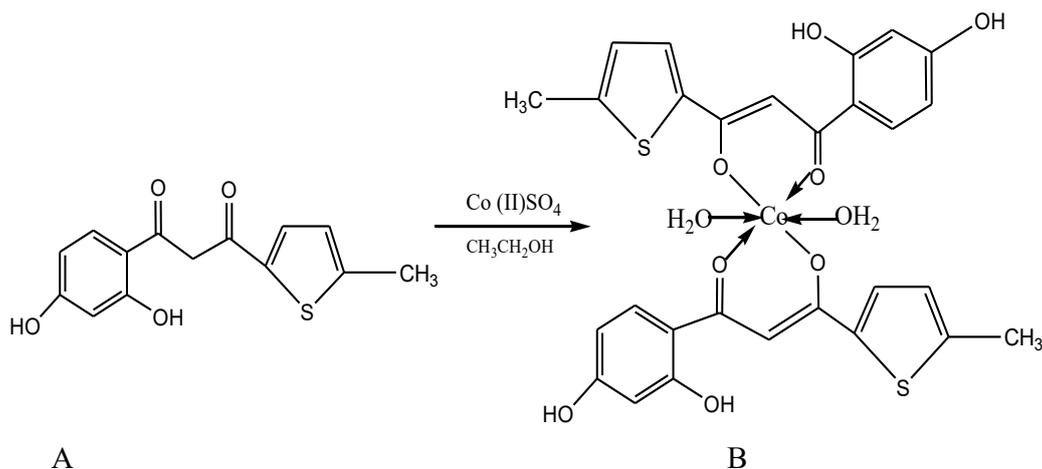
A = 1-(4-methylthiophen-2-yl)-3-(2,4-dihydroxyphenyl) propane-1,3-dione

B = Co(II) metal complex of β-diketone

Synthesis of metal complexes

The Potentiometric titration of metal-ion Ni (II) with a B-diketone ligand

The conductivity and pH of distilled water is keep a constant 1.60×10^{-6} mhos and 6.7 respectively and this distilled water is used to prepare the solution i.e. metal-ion, acid, potassium nitrate and sodium hydroxide solution and this sodium hydroxide standardized using a

acid the ligand L4 5.59 gm and the metal sulphate 3.24 gm is added in ethanol and its titrate against sodium hydroxide with stirring continuously.

1. Free (0.02M) HNO_3 [A]
2. Free (0.02M) HNO_3 + (0.02M) Ligand [A+L4]
3. Free (0.02M) HNO_3 + (0.02M) Ligand + (0.01M) Metal ion [A+L4+ Ni (II)]

the values comes from titration is ploted Emf Vs NaOH added and the successive pH of volume of NaOH is added for each set of solution is determine and calculate the dissociation constant and the stability constant.
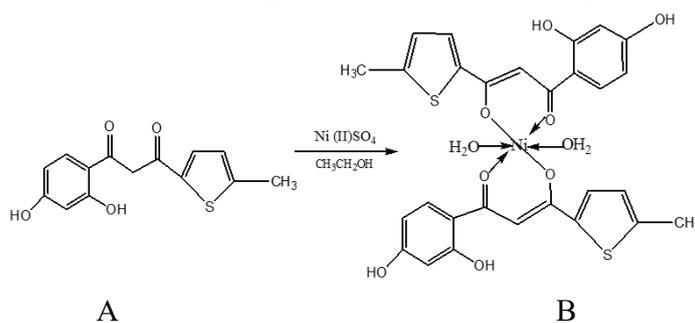
A   B

A   =   1-(4-methylthiophen-2-yl)-3-(2,4-dihydroxyphenyl)propane-1,3-dione

B = Ni (II) metal complex of β-diketone

Result And Discussion:

Synthesis of metal complexes

Table 1: Determination of pH of Co (II) ligand [L4] complex

Vol. NaOH(cm^3)	Emf A	Emf A+L4	Emf A+L4+Co	pH A	pH A+L4	pH A+L4+Co
0	297	296	301	2.69	2.70	2.62
0.5	294	294	299	2.74	2.74	2.65
1	292	291	294	2.77	2.79	2.74
1.5	290	289	290	2.80	2.82	2.80
2	286	287	286	2.87	2.85	2.87
2.5	280	282	283	2.97	2.94	2.92
3	272	272	275	3.11	3.11	3.06
3.5	266	265	268	3.21	3.23	3.18
4	258	259	258	3.35	3.33	3.35
4.5	244	246	250	3.58	3.55	3.48
5	14	200	221	7.47	4.33	3.97
5.5	-216	-176	6	11.37	10.69	7.61
6	-238	-220	-195	11.74	11.43	11.01
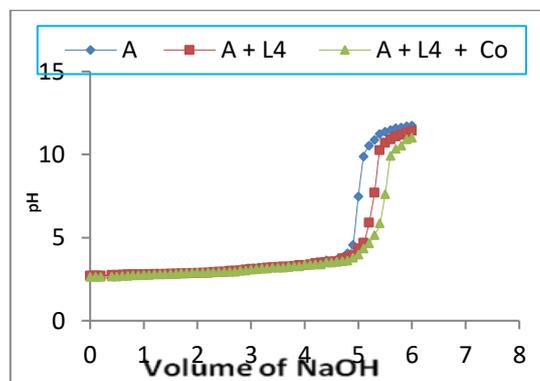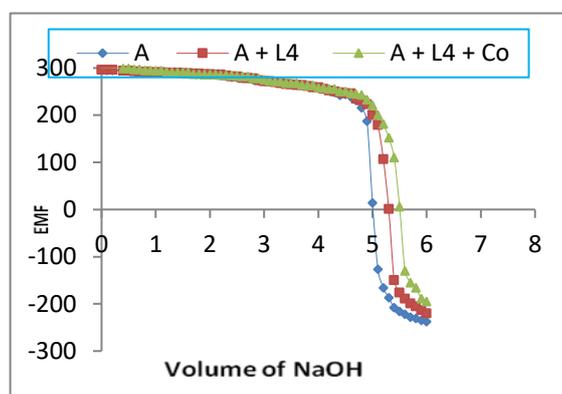
Graph 3.1 Potentiometric titration curve of (L4) with transition metal Co (II)

a) NaOH vs pH b) NaOH vs EMF

A] Potentiometric titration of 1-(4-methylthiophen-2-yl)-3-(2,4dihydroxyphenyl) -propane 1,3 dione[L4] with metal ion [Co(II)]:

According to the results obtained from figure 3.1 i.e. graphical representation of emf vs. volume of NaOH added two protonation constants pH is 7.61 And from figure 3.1, we also conclude that thetitration curves of the Co(II) complex is lower with β-diketone ligand (L4), by displacement of protons.

According to the graphical representation of fig. 3.1 we evaluated concentration of H$^+$ ions in the solutionfrom pH

value and stability constant value of Co (II)complex separately, it is seen that the values

for conc. of H⁺ 0.881 and stability constant value is 3.073

Table 2: Determination of pH of Ni (II) ligand [L4] complex

Vol. NaOH (cm^3)	Emf A	Emf A+L4	Emf A+L4+Ni	pH A	pH A+L4	pH A+L4+Ni
0	298	297	298	2.67	2.69	2.67
0.5	296	296	295	2.70	2.70	2.72
1	292	293	293	2.77	2.75	2.75
1.5	287	290	291	2.85	2.80	2.79
2	285	288	287	2.89	2.84	2.85
2.5	282	283	280	2.94	2.92	2.97
3	273	274	274	3.09	3.07	3.07
3.5	269	267	265	3.16	3.19	3.23
4	259	259	258	3.33	3.33	3.35
4.5	248	248	248	3.51	3.51	3.51
5	187	215	225	4.55	4.07	3.90
5.5	-201	-143	5	11.11	10.13	7.63
6	-249	-209	-178	11.92	11.25	10.72
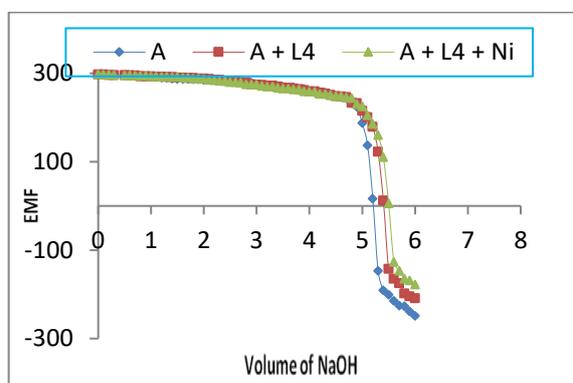
(a)
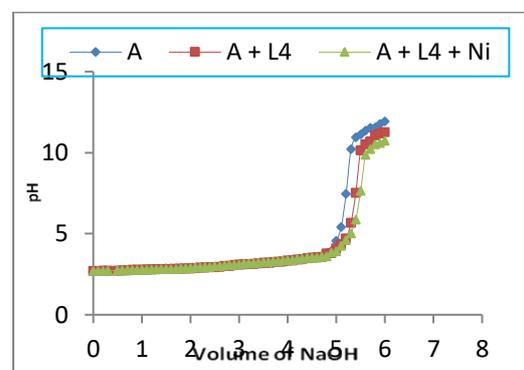
(b)

Graph 3.2 Potentiometric titration curve of (L4) with transition metal Ni(II)
a) NaOH vs pH b) NaOH vs EMF

B] Potentiometric titration of 1(4-methylthiophen-2-yl)-3-(2,4dihydroxyphenyl)-propane 1,3 dione[L4] with metal ion [Ni(II)] :
According to the results obtained from figure **3.2** i.e. graphical representation of emf vs. volume of NaOH added, have two protonation constants. The one of the value of potentiometric titration

curves of Ni (II) system, protonsat pH 7.63 And from figure **3.2** we also conclude that the titration curves of the Ni (II) complex is lower from that of the free β-diketone ligand (L4) curve, indicating formation of Ni (II) complex with β-diketone ligand (L4), by displacement of protons.

According to the graphical representation of fig. **3.2** we evaluated concentration of H^+ ions in the solution from pH value and stability constant value of Ni (II)complex separately, it is seen that the values for H^+ ions 0.882 and stability constant value is 3.080.

1) Stability Constants of Co (II)complex Compound is 3.073
2) Stability Constants of Ni (II)complex Compound is 3.080

Conclusion:

This is observed for Co (II)-L4 at pH= 7.61. According to the graphical representation we evaluated that the values for conc. for proton ions 0.881 and stability constant value is 3.073. Here the observed values for Ni (II)-L4 at pH= 7.63. According to the graphical representation we evaluated that the values for concentration for proton ions 0.882 and stability constant value is 3.080.

The order of stability is Ni>Co>. The stability constant of metal-ions is as follows are Co (II)-L4=3.073, Ni (II)-L4=3.080 The trend of stability constant of metal-ion complex is Co (II)>Ni (II)

Acknowledgement:

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Impact of Artificial Intelligence on the Future of Accounting and Auditing: A Comprehensive Secondary Research Review

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Abstract:

Artificial intelligence (AI) has become a central driver of change within the accounting and auditing professions. Its capabilities—ranging from automating repetitive financial tasks to providing advanced analytical insights—are transforming how financial information is prepared, monitored and assured. This paper presents a consolidated review of secondary literature published between 2020 and 2025 to investigate how AI is reshaping accounting and auditing practices. The evidence shows that AI improves efficiency, enhances accuracy and strengthens audit effectiveness. However, its adoption simultaneously raises concerns regarding ethical integrity, data transparency, system reliability and the digital skills required of professionals. The findings suggest that AI will operate as a complementary tool that elevates the professional role rather than replacing human expertise. The review concludes with implications for practitioners, educators and regulators as they navigate the evolving technological landscape.

Keywords: Artificial intelligence, accounting innovation, audit transformation, automation, digital assurance, secondary research

Introduction:

Artificial intelligence (AI) has moved from being a futuristic concept to becoming a practical and influential component of modern accounting and auditing systems. Organisations across the world are integrating AI into their financial workflows to handle activities such as transaction processing, document examination, analytical review and risk screening. What traditionally required extensive human time and effort is increasingly supported by intelligent systems capable of processing large volumes of information at remarkable speed and accuracy. As a result, the role of accountants and auditors is undergoing a significant shift—from performing routine clerical tasks toward engaging in higher-order analysis, interpretation and decision support.

The auditing landscape is experiencing a parallel transformation. AI-powered tools allow auditors to examine full sets of transactional data instead of relying solely on samples. These tools can detect subtle patterns, identify irregularities and provide more reliable indicators of potential misstatements or fraud. This technological shift promises substantial improvement in audit efficiency and the quality of assurance services. However, the rapid emergence of AI also introduces new complexities: opacity in algorithmic decision-making, ethical risks, concerns over data security and the need for practitioners to adapt to unfamiliar digital systems.

Given these developments, understanding AI's influence on accounting and auditing is no longer optional—it is essential for the

sustainability and effectiveness of the profession. This paper synthesises secondary research to offer an integrated perspective on how AI is reshaping core professional activities, what opportunities it brings and what challenges must be addressed to fully realise its potential. Rather than treating AI as a disruptive threat, this review positions it as a catalyst for redefining and strengthening professional practice in the years ahead.

Statement of the Problem:

Research on AI in accounting and auditing is widespread but fragmented, making it difficult to form a unified understanding. The existing literature does not consistently address several critical issues:

1. Which AI tools and applications are being used across accounting and auditing functions?
2. How do these technologies improve efficiency, analytical capability and assurance quality?
3. What limitations, ethical risks and implementation barriers accompany AI adoption?
4. How will AI reshape the expectations, competencies and responsibilities of accounting and audit professionals?

A structured secondary review is therefore necessary to synthesise findings and identify patterns across the growing body of research.

Objectives of the Study:

The study aims to:

1. Identify major AI applications influencing accounting and auditing.
2. Evaluate the benefits of AI in enhancing reporting and audit processes.
3. Examine the operational, ethical and technological challenges associated with AI.

4. Understand how AI adoption is reshaping professional roles and required skill sets within the field.

Scope and Delimitations:

- The study is entirely based on **secondary evidence** from journal articles, industry analyses and professional publications dated between **2020 and 2025**.
- The focus includes financial accounting, management accounting, internal audit and statutory auditing.
- Technical aspects of AI algorithms are outside the scope; emphasis is placed on practical implications, challenges and applications.
- The review draws from global sources, with occasional references to the Indian context where applicable.
- Only peer-reviewed or professionally recognised sources have been included.

Methodology: Secondary Research Approach:
1.Data Sources:

Literature was sourced from:

- Academic journals (Scopus, ScienceDirect, Emerald, Springer)
- Publications by ICAI, IFAC and Big Four firms
- Regulatory documents and government reports
- Verified business reports and technology insights

2.Inclusion Criteria:

To ensure reliability:

- Only literature between **2020–2025** was included
- Publications had to focus on AI's impact on accounting, auditing or assurance
- Both empirical studies and conceptual reviews were considered

3. Analysis Technique:

The collected literature was categorised into four themes:

1. AI applications in accounting
2. AI integration in auditing and assurance
3. Ethical considerations, skills and professional competency
4. Regulatory and governance challenges

A narrative synthesis method was used to summarise patterns and themes without statistical analysis.

Review of Literature:

1. Hasan (2021): Foundational Exploration of AI Adoption in Accounting and Auditing: Hasan (2021) offered an early and influential examination of AI's role in streamlining accounting operations, highlighting how automated systems can perform data entry, invoice processing, classification and reconciliation with far greater speed and accuracy than manual methods. The study emphasized that AI enables accountants to shift away from repetitive clerical tasks and instead focus on analytical and interpretive responsibilities. Hasan also noted that AI can strengthen internal controls by identifying unusual transactions or patterns that human analysts may overlook. However, the author raised concerns about the widening digital skills gap within the profession, warning that organizations failing to invest in staff training may struggle to derive full benefits from AI. The research stressed the need for interdisciplinary collaboration, suggesting that the future of accounting will rely heavily on professionals who understand both financial principles and intelligent system**s.**

2. Mediaty (2024): Systematic Assessment of AI Tools Across Accounting Functions: In one of the more comprehensive systematic reviews, Mediaty (2024) mapped out how AI is influencing various branches of accounting, including financial reporting, cost analysis, budgeting and forecasting. The author documented that intelligent systems are increasingly being used to support judgment-oriented tasks such as scenario planning and variance analysis. According to the review, AI adoption is significantly more widespread among large organizations with access to strong technological infrastructure, whereas small and medium-sized enterprises (SMEs) often face financial and technical barriers that limit their adoption capacity. A significant insight from this study is the identification of persistent research gaps: although many publications claim that AI improves decision quality, there is limited empirical work evaluating whether AI consistently enhances accountants' judgment, ethical reasoning or neutrality in reporting. The review called for more field-based studies and industry-academic collaboration to address these gaps.

3. Han et al. (2023): Convergence of Blockchain and AI in Assurance Services: Han et al. (2023) investigated the combined impact of blockchain and AI on accounting and auditing systems. Their review noted that AI's analytical strength and blockchain's immutable data structure complement one another—blockchain establishes the reliability and authenticity of records, while AI extracts patterns, relationships and anomalies from these verified datasets. This integration, the authors argued, enables highly reliable real-time auditing and strengthens an organisation's defence against financial fraud. More importantly, the study emphasized that auditors would need enhanced technological literacy to evaluate system functioning, validate AI outputs and understand algorithmic behaviour. The authors stressed that unless auditors develop competencies in blockchain architecture, machine learning logic and data governance, the potential

benefits of integrated AI-blockchain systems may remain unrealized.

4.Lai (2025): Influence of AI on Audit Fees and Engagement Structure: Lai (2025) contributed uniquely to the literature by examining how AI influences audit pricing. Using empirical data from Chinese A-share companies, the study found that firms employing AI systems in their internal processes are often associated with **lower audit fees**, primarily because auditors perceive reduced audit risk and enjoy greater efficiency in gathering and analysing evidence. AI-enabled internal controls, for example, help auditors complete substantive procedures more quickly due to increased reliability of client data. However, the paper also cautioned that audit fees may rise or stabilize in cases where auditors must perform additional procedures due to the complexity of AI systems or uncertainty regarding algorithmic reliability. The study thus highlights that AI affects not only audit methods but also the economic structure of audit engagements.

5.Wijaya et al. (2025): Empirical Literature Review on AI and Audit Quality: The study by Wijaya et al. (2025) is notable for its scale, reviewing over 300 publications related to AI's implications for audit quality. The authors concluded that AI is generally associated with improvements in fraud detection, anomaly identification, risk analysis and early warning systems. Importantly, the review pointed out that AI can enhance auditors' ability to interpret large datasets, thereby reducing the likelihood of missed irregularities. However, the study flagged an important gap: the majority of research works rely on auditor perceptions rather than concrete audit outcomes such as financial restatements, inspection results or enforcement actions. The authors argued that future research must include large-scale empirical testing to evaluate whether AI adoption leads to measurable improvements in audit reliability, independence and objectivity.

6.Leocádio et al. (2024): Conceptual Model for AI-Driven Digital Audit Transformation: Leocádio et al. (2024) proposed a conceptual framework describing AI's evolving role within auditing. According to the authors, AI supports auditors in three major ways:

1. **Automation**, by taking over routine procedures such as document review and sampling;
2. **Augmentation**, by supporting professional judgment through sophisticated analytical tools;
3. **Innovation**, by enabling new forms of audit insight such as real-time risk dashboards and predictive forecasting.

The study also addressed a crucial point— although AI may enhance efficiency and provide richer insights, auditors must still verify, interpret and critically evaluate AI-generated results. Without expert oversight and systematic checks, auditors may risk over-reliance on algorithms whose internal logic is not fully transparent. Thus, the authors highlighted the need for governance mechanisms, including documentation standards, model validation processes and explainability protocols, to ensure responsible AI deployment in audit environments

7.Murikah et al. (2024): Ethical, Bias and Transparency Concerns in AI-Assisted Auditing: Murikah et al. (2024) explored ethical risks associated with AI, particularly the dangers of biased training data and opaque algorithms. The authors warned that AI systems trained on flawed datasets may produce discriminatory outcomes, such as misclassifying legitimate transactions as high-risk or prioritizing certain clients over others. These findings raise major questions about fairness, objectivity and the ethical responsibilities of auditors using AI-assisted tools. The study recommended that firms

introduce bias-testing mechanisms, ensure transparency in algorithmic design and clearly define accountability when AI outputs influence audit conclusions. The authors also emphasized the need for regulatory intervention to develop ethical guidelines governing AI use in assurance services.

Summary of Literature: Across all reviewed studies, several common themes emerge. First, AI is widely acknowledged as a transformative force capable of elevating accounting accuracy, audit quality and fraud detection capabilities. Second, almost every study emphasizes that AI augments professional expertise rather than replacing human judgment. Third, significant challenges—such as skill gaps, ethical concerns, algorithmic bias, cybersecurity risks and a lack of robust governance frameworks—continue to hinder seamless adoption.

Moreover, while conceptual work strongly supports AI's benefits, empirical research linking AI adoption to actual audit and financial outcomes remains limited. Future research must therefore prioritise outcome-based studies rather than perception-driven evaluations.

The reviewed literature collectively highlights that AI has immense potential but must be implemented carefully, ethically and with strong oversight to ensure that it strengthens, rather than undermines, the credibility of the accounting and auditing profession.

Discussion:

1.Benefits of AI in Accounting and Auditing:

AI contributes to**:**

- **Process automation**, reducing manual workload
- **Higher reporting accuracy** through intelligent data validation
- **Advanced analytics**, allowing deeper financial insight

- **Improved fraud detection**, by discovering hidden patterns
- **Enhanced audit efficiency** via full-population testing
- **Creation of new assurance services**, such as AI model assurance

2.Challenges and Limitations:

Key obstacles include:

- Difficulty interpreting complex AI models ("black box" issue)
- Risk of algorithmic bias and ethical misuse
- Vulnerability to cybersecurity threats
- High financial and infrastructural costs for smaller entities
- Lack of universally accepted audit standards for AI usage
- Gaps in technical proficiency among professionals

3.Changing Role of Professionals: As AI increasingly takes over mechanical tasks, professionals must focus on:

- Analytical review and interpretation
- Providing advisory services
- Exercising ethical reasoning
- Understanding and supervising AI-generated outputs

Digital literacy, data awareness and ethical sensitivity will become core competencies for future accountants and auditors.

Implications and Recommendations:

For Practitioners:

- Establish governance frameworks that monitor AI accuracy, fairness and reliability.
- Strengthen collaboration between financial professionals and data technologists.
- Maintain human judgment as the primary decision-making authority.

For Educators:

- Integrate AI, data analytics and digital ethics into accounting curriculum.

- Encourage continuous professional development in technological skills.

For Regulators:
- Develop guidance on handling AI-generated audit evidence.
- Require transparency and accountability in the use of AI systems.
- Promote industry-wide standards for AI governance.

Conclusion:

The review of secondary literature clearly demonstrates that AI is steadily altering both the operational and strategic dimensions of accounting and auditing. Its ability to automate repetitive work, enhance data accuracy and support deeper analytical procedures positions AI as a valuable tool for improving organisational decision-making and audit reliability. However, the benefits of AI can only be fully realised when accompanied by strong governance structures, ethical safeguards and continuous upskilling of professionals. The technology itself does not guarantee improved outcomes; its effectiveness relies on informed, responsible and well-supervised implementation.

Across the literature, one theme remains consistent: AI does not eliminate the need for accountants or auditors. Instead, it reshapes their responsibilities. Human judgment, ethical reasoning and contextual understanding are irreplaceable, even in highly digital environments. As AI takes over mechanical tasks, professionals will increasingly be required to interpret insights, question model outputs, evaluate risks and communicate complex findings to stakeholders. The profession is thus moving toward a model where technological competence and analytical capability are as vital as traditional accounting expertise.

In conclusion, AI should be viewed as an enabler that elevates the quality, scope and relevance of accounting and auditing rather than a substitute for professional roles. The future of these fields depends on the ability of practitioners, regulators and educators to embrace digital transformation while upholding the principles of accuracy, transparency and ethical conduct. With appropriate preparation and governance, AI can become a cornerstone of a more efficient, insightful and resilient accounting and auditing profession.

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Resistance And Freedom In Bama's Autobiography Karukku

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Abstract:

This research paper examines the thematic intersections of resistance and freedom in Bama's autobiographical narrative Karukku (1992). Positioned within Dalit feminist discourse, Karukku articulates a lived praxis of resistance against caste and gender oppression while asserting the quest for freedom through self-narration. This study investigates how Bama's narrative strategies subvert dominant caste structures, destabilize hegemonic religious discourse, and reclaim embodied autonomy. Utilizing a Dalit feminist theoretical framework, the research foregrounds caste as structural violence and femininity as a site of both subjugation and resistance. Through close textual analysis with contextual quotations, the paper argues that Karukku exemplifies autobiography as a tool of political resistance and a declaration of freedom of self-hood. Ultimately, this study contends that Bama's narrative reshapes conventional autobiography by foregrounding the voices of those historically marginalized, thereby extending the parameters of emancipatory literature.

Keywords Dalit Feminism, Caste Resistance, Freedom, Autobiography, Subaltern Narrative, Bama, Karukku.

Introduction:

The Tamil autobiography Karukku by Bama (1992; translated into English as *Karukku: A Dalit Woman's Account of Caste and Gender in South India*) is a seminal work in Dalit literature that maps the intersections of caste, religion, gender, and freedom. Written in a vernacular grounded in lived experience, Karukku is not merely a life story; it is a site of resistance against entrenched systems of oppression. Bama, born into the Paraiyar caste in Tamil Nadu, articulates the stark realities of caste discrimination and patriarchal subjugation within both caste Hindu society and Christian institutional frameworks. Her narrative captures the emotional and psychological landscapes of a Dalit woman's life, from her rural childhood to her engagement with education, work, faith, and gendered expectations. In doing so, Karukku challenges dominant epistemologies that have historically silenced Dalit voices

This paper explores how resistance and freedom operate as dual thematic axes in Karukku. Resistance, as expressed by Bama, is not solely oppositional but also generative a force through which new identities and modes of freedom emerge. Freedom in Karukku is multi-dimensional: it encompasses liberation from caste hierarchies, freedom from patriarchal norms, and the assertion of autonomy over one's body, speech, and narrative.

Theoretical Framework:

This study situates itself within the emergent field of Dalit feminism, a critical lens that recognizes caste and gender as co-constitutive structures of power. Dalit feminism foregrounds experiences of Dalit women who encounter oppression not only because of their

caste position but also because of their gender. Drawing on the works of B. R. Ambedkar, Gail Omvedt, and contemporary Dalit feminists such as Sharmila Rege, the paper underscores the significance of Dalit women's self-narration as a mode of resistance.

Ambedkar articulates caste as a structural hierarchy that determines social, economic, and symbolic order (Ambedkar, Annihilation of Caste). For Dalit women, caste intersects with patriarchy, creating compounded marginalization that is both systemic and embodied. Dalit feminist theory insists on analyzing caste as a lived reality that shapes access to freedom, autonomy, and dignity.

Autobiography as Political Practice:

Autobiography has been theorized as an intrinsically political form, especially in the context of marginalized voices. As articulated by scholars like Glenndora & Eakin, autobiography serves to reclaim agency by enabling the subaltern subject to narrate their own life beyond dominant discourses. In Karukku, Bama's narrative choices, her candid tone, vernacular ethos, and refusal to sentimentalize suffering serve this political function.

Resistance- Caste, Christianity and Body:

Bama's narrative unfolds in the backdrop of caste-based discrimination pervasive in Tamil Nadu's social fabric and within Christian institutions that proclaim egalitarianism. Although Christianity is positioned as a liberating force, Bama exposes how caste prejudices permeate religious spaces.

She writes:

> "Even in the church, I was made to sit in the back row. The caste I carried with me went into the building with me." (Karukku, p. 57)

This quotation reveals her discovery that religious conversion did not expunge caste hierarchies an early lesson in the limits of institutional faith and the persistence of caste as structural violence.

Language Resistance: Bama's life itself becomes a resistance to caste conventions. Her educational journey, fraught with discrimination and exclusion, exemplifies how schooling becomes a contested space for Dalit subjectivity. In one instance, her teacher reprimands her for sitting in a seat reserved for caste-privileged students. Instead of internalizing shame, Bama asserts:

> "I refused to leave the seat. I was not sitting there because I wanted to be insulted. I was sitting there because I had the right to be educated." (Karukku, p. 82)

Here resistance assumes the form of self-assertion against symbolic boundaries that police caste space. Bama's insistence on her right to education challenges normative caste codes that deem Dalits as unworthy of intellectual pursuits.

Bama's use of language itself is an act of resistance. She distills her narrative in simple, direct Tamil, resisting elite literary diction that might alienate her community. By centering colloquial speech and idioms, Bama democratizes narrative form, signaling that the stories of the oppressed are worthy of literary articulation. Her narrative moves between Tamil and English terms, challenging linguistic hierarchies shaped by colonial and elitist sensibilities. This linguistic hybridity becomes a vehicle of resistance against hegemonic literary traditions.

Gendered Violence: While caste oppression is a core theme, Bama's narrative also critically explores gendered violence within and beyond the Dalit community. She documents sexual harassment, patriarchal policing of women's behavior, and the stigma attached to women's bodies.

In a powerful passage, she recounts:

> "When he touched me without permission, I felt the weight of centuries pressing down on

my body. But I also felt a spark of defiance I would not be silent." (Karukku, p. 129)

This moment marks a transformation from victimhood to resistance. Bama refuses to remain silent about gendered violence, asserting her bodily autonomy and articulating a feminist assertion that is inseparable from her caste identity.

Religious Resistance: Bama's spiritual journey reveals another layer of resistance, toward re-imagining religious identity outside patriarchal and casteist interpretations. While she is drawn to Christianity for its egalitarian promise, she confronts the persistence of caste prejudice within church structures. Her narrative demonstrates that resistance is not a rejection of faith but a reclamation of spiritual autonomy. She writes:

"I did not abandon my faith. I embraced it more deeply, even while exposing its contradictions." (Karukku, p. 161)

This illustrates the complexity of resistance not as simple opposition, but as critical engagement that dismantles oppressive structures while preserving personal spiritual agency.

Freedom as self self definition: In Karukku emerges as self-definition an authorial project in which Bama names herself beyond casteed and gendered identities imposed by society. Through narration, she claims the right to define her life rather than have it defined by others. This self-definition is itself a form of freedom:

"I call myself first, before any other name given to me." (Karukku, p. 14)

This opening line signals the existential act of naming the self, an assertion central to emancipatory projects.

Education: For Bama, education is not merely a route to employment; it is a portal to intellectual freedom and critical consciousness. Her pursuit of education defies casteed expectations that relegated Dalits to menial labor. Her narrative suggests that education functions as praxis: it equips her with the tools to analyze and challenge structural oppression. She writes: "Through books, I found the courage to see the world differently." (Karukku, p. 95)

Education thus becomes both a means and an end in her journey toward freedom. By choosing to narrate her story, Bama exercises narrative agency, a freedom that disrupts silences. Autobiography becomes a space where she rewrites the terms of her existence, displacing narratives that have historically silenced Dalit voices. Bama's act of writing is itself a declaration of freedom:

"I write not because I want to be witnessed, but because I refuse to be forgotten." (Karukku, p. 5)

Her refusal to be forgotten is an assertion that Dalit lives matter, not as objects of pity, but as subjects of history and culture. One of the most significant yet subtle aspects of freedom in Karukku is the liberation from internalized oppression. Early in her life, Bama internalizes stereotypes about her caste and worth. However, through critical reflection, she dismantles these internalized structures, reclaiming self-worth and dignity. In a key reflective moment, she writes:

"The chains were never on my body. They were in my mind. Once I broke them, nothing could bind me." (Karukku, p. 207)

This passage highlights that freedom, for Bama, is as much psychological as it is socio-political.

Discussion: Resistance and Freedom in Relation:

The dynamic interplay between resistance and freedom in Karukku illustrates that freedom is not an outcome that emerges independently of struggle. Instead, freedom is both the product and catalyst of resistance. Bama's narrative demonstrates that resistance transforms individual experience and collective imagination. Her script

of resistance encompasses educational, linguistic, religious, corporeal, and narrative domains. Freedom, conversely, is not an abstract ideal but a lived reality that unfolds through acts of resistance.

Moreover, the Dalit feminist lens underscores that freedom cannot be fully realized without confronting the dual structures of caste and patriarchy. Bama's articulation of freedom thus situates her narrative within a broader emancipatory project that resists singular definitions of liberation and insists on intersectional recognition.

Bama's Karukku resonates with other Dalit autobiographies, such as Om Prakash Valmiki's Joothan and Dr. B.R. Ambedkar's writings, in its commitment to truth-telling and critique of caste. However, Karukku distinguishes itself by infusing a feminist sensibility that foregrounds the lived experiences of Dalit women. While male Dalit autobiographies primarily address caste violence and labor exploitation, Karukku expands the discourse by integrating gendered experiences of domestic violence, sexual harassment, and psychological marginalization. This integration broadens the scope of Dalit autobiography and situates Bama's narrative within global feminist autobiographical traditions.

Conclusion:

Bama's Karukku is a powerful testament to the intertwined journeys of resistance and freedom. Through her autobiographical account, Bama dismantles hierarchical norms of caste and gender while articulating a vision of freedom rooted in self-definition, education, and narrative agency. The narrative's political significance lies not only in its critique of structural violence but also in its affirmation of Dalit women's lived realities. Karukku does not simply narrate suffering; it showcases how resistance yields freedom that is both individual and collective. This research has examined the nuances of resistance and freedom as depicted in Karukku. It has highlighted how Bama's narrative disrupts normative literary forms and reclaims voice for the geographically and socially marginalized. As a seminal work in Dalit feminist literature, Karukku continues to resonate as a testimony of resilience and a call for emancipatory consciousness.

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Vision of the Millennium India 2047: Role of Mathematics

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Abstract:

As India approaches 100 years of independence in 2047, the nation aspires to become a global leader in prosperity, innovation, and sustainable development. The history of mathematics indicates that whenever a civilization placed a high value on mathematical ability, it made remarkable progress. Pivotal to achieve this vision is Mathematics a foundational discipline that drives science, technology, economy, and decision-making. This paper explores how Mathematics and English language can contribute to India's progress and outline strategies for leveraging Mathematical knowledge to realize India's Millennium Vision 2047.ip

Introduction:

India's rapid growth in the 21st century has been remarkable, powered by economic reforms, technological adoption, and a young skilled workforce. Looking ahead to 2047, the Vision of Millennium India envisions a nation that is economically prosperous, scientifically advanced, socially inclusive, culturally rich and environmentally sustainable. To achieve such a holistic development requires rigorous analytical thinking, quantitative decision-making and innovation; all deeply rooted in English language and Mathematics. The vision of Millennium India 2047, also known as Vikasit Bharat 2047, aims to transform India into a developed nation by its centenary of independence. Mathematics and English subjects plays a pivotal role in achieving this vision, driving progress in several key areas.

Significance of Mathematics:

Mathematics is not just numbers and formulas; it is the language of science and technology. It is the language of the nature and the universe. It underpins every domain.

The survival of Science and Engineering depends on Mathematics. Calculus, algebra, and statistics are essential for designing systems from bridges to satellites and all complex procedures in the industry.

Technology and AI are incomplete without Mathematics. Machine learning algorithms, cryptography, and data science rely on mathematical models.

Economics and Finance cannot run without Mathematics. It enables accurate forecasting, optimization of resources, and risk analysis.

In educational sphere Mathematics enhances logical reasoning, problem-solving skills, and critical thinking.

Governance and Policy rely on Mathematics for data analysis. It drives evidence-based policy making and efficient public services. No government can get authentic social, economical and statistical data for policy making and revival of old policies.

Thus, Mathematics is the very life-blood of science, technology, governance and data

analysis. It acts as both a tool and mindset for innovation and problem-solving.

India's Vision 2047: The Millennium Goals:

The Vision of India 2047 is a comprehensive roadmap to transform the country into a developed nation by 2047, marking 100 years of independence. The vision encompasses several key objectives:

India wants to become a developed, self-reliant nation with a $30–$40 trillion economy and a per capita income of $18000 to over $26000.

In economic prosperity India wants to become the third largest economy in the world.

We are striving for technological leadership of the world in World in AI, space exploration, and renewable energy.

India will have to focus on inclusive growth. The key areas will be education, health care, industrialization and opportunities for all.

Sustainable development with net-zero emissions and climate resilience are the main areas.

Strengthening domestic manufacturing in defense, electronics, and renewable, alongside building better roads and digital networks

We will have to develop global partnerships in all the fields with like-minded global friends. India will have to aim for greater role in global governance and development.

Modernizing agriculture through AI based management and digital marketplaces.

To achieve these ambitious goals, India will need to address challenges like infrastructure development, energy security, water management, and social inequality. Citizen participation, innovation and technology will play crucial roles in realizing the Vikasit Bharat 2047vision. Also, to realize these goals, Mathematics plays a vital role in planning, execution, monitoring, and evaluation.

Role of Mathematics in key sectors:

a) Education and Human Development: Mathematical education cultivates logical thinking and prepares students for careers in STEM. Strengthening Mathematics' education from primary to higher levels will build a highly skilled work force essential for India's global competitiveness.

b) Education and Skill development: Emphasizing mathematical literacy and critical thinking in schools will nurture a skilled workforce, fostering innovation and entrepreneurship.

c) Science and Technology: Mathematics is the backbone of modern technologies like quantum computing, artificial intelligence, cyber security and robotics is founded on Mathematical theories, which are crucial for India's growth in sectors like defense, space exploration, and healthcare. India's ambition to lead in these fields demands advanced research in Mathematics and its applications.

d) Economic Planning, Policy and Finance:

Mathematical models will help in:

1. Predicting economic trends
2. Analyze economic variables
3. Forecast trends
4. Optimizing resource allocation
5. Managing national budgets
6. Designing financial products
7. Supporting sustainable development and poverty reduction

These activities support economic stability and growth.

e) Data Analysis and Decision Making: The digital transformation of India relies on data. Mathematics, particularly statistics and probability, enables interpretation of complex data sets to inform policy and business strategies. Also, with the rise of big data, mathematics enables informed policymaking, improving governance and addressing societal challenges

like healthcare optimization and environmental sustainability.

f) Infrastructure Development: Mathematics aids in designing efficient transportation systems, smart cities, and renewable energy solutions, enhancing India's global competitiveness.

g) Sustainable Development: Climate models, energy optimization, and environmental impact and their analyses all use Mathematics. Accurate modeling will help India balance development with sustainability.

Strategies to amplify the role of Mathematics:

To maximize the impact of Mathematics on India's 2047 vision, several strategic steps are essential:

a) Curriculum Reforms: India aims atemphasizing problem-solving, computational thinking, and real-world applications.

For this integration of Mathematics with other disciplines like Biology, Economics, Computer science and Health sciences.

b) Research and Innovation: We will have to increase funding for Mathematical research and interdisciplinary initiatives.

Establish centers of excellence in key areas such as cryptography, AI and Applied Mathematics.

c) Technology Integration: We will have to use educational technology to personalize learning and improve access.

The focus should be on promoting open data and analytical tools for research and governance.

d) Collaborative Ecosystems: Encourage partnerships between academia, industry, and government. India must aim at supporting student internships and industry-linked projects focused on Mathematical applications.

Challenges and Solutions:

This great vision of India in 2047 will not be achieved so easily. Every field in the country will have to contribute significantly. The major challenges that we confront today are as follows. Lack of quality Mathematics' education in rural areas Insufficient investment in teacher training and digital resources. Perception of Mathematics as difficult subject

Lack of proper knowledge of English language is also an important impediment in the way of generating interest of students in Mathematics. We will have to find solutions; urgent and effective solutions to such problems in order to remove these impediments from achieving our vision in 2047.We will have to introduce engaging pedagogies and real-life contexts. Limited research funding is another problem that we are facing. India needs to increase public and private investment in all the sectors. To solve the issue of gap between theory and industrial practices We need to strengthen industry-academia collaboration. More focus should be given on learning English language to create skilled youth ready for the employments in various sectors.

Conclusion:

Mathematics is indispensable for India's growth trajectory toward 2047. It empowers innovation, strengthens decision-making, and drives advancements across every major sector. With focused educational reforms, enhanced research, and cross-sector collaborations, Mathematics can significantly contribute to the realization of Vision of the Millennium India 2047. Ultimately, a mathematically empowered society is not just an asset but a foundation for national progress.

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Study on AI-Augmented Strategic Decision-Making and Enterprise Intelligence

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Abstract:

The increasing complexity, uncertainty, and scale of contemporary business environments have rendered traditional decision-making frameworks inadequate for sustained competitive advantage. Artificial Intelligence (AI), when integrated with enterprise intelligence systems, has emerged as a transformative enabler of strategic decision-making [1], [4]. This paper examines the role of AI-augmented enterprise intelligence in enhancing strategic planning, operational agility, and organizational performance. By synthesizing recent advances in machine learning, data analytics, and intelligent decision support systems [6], [9], the study proposes a conceptual framework that illustrates how AI capabilities augment human judgment rather than replace it [3], [16]. The paper further discusses architectural components, strategic benefits, implementation challenges, and ethical considerations associated with AI-driven decision systems [7], [17], [18]. The findings suggest that AI-augmented enterprise intelligence enables data-driven foresight, adaptive strategy formulation, and real-time decision optimization, positioning organizations to respond proactively to dynamic market conditions [5].

Keywords: Artificial Intelligence, Strategic Decision-Making, Enterprise Intelligence, Decision Support Systems, Business Analytics.

Introduction:

Strategic decision-making is central to organizational success, directly influencing long-term performance, resilience, and competitiveness [10]. Conventional enterprise intelligence systems, largely dependent on descriptive and diagnostic analytics, are increasingly insufficient in addressing the velocity, variety, and volatility of modern enterprise data [12]. The proliferation of digital technologies, coupled with global competition and rapidly shifting customer expectations, necessitates more adaptive and predictive decision mechanisms [2], [5]. AI-augmented decision process is illustrated in Fig-a below.

Fig-a. AI- Augmented Strategic Decision making

Artificial Intelligence (AI) offers a paradigm shift by enabling enterprises to process massive datasets, uncover hidden patterns, and generate actionable insights at unprecedented speed and scale [1], [8]. Rather than functioning as autonomous decision agents, contemporary AI systems increasingly operate as cognitive collaborators, augmenting human strategic reasoning [3], [19]. This paper explores how AI-augmented enterprise intelligence reshapes

strategic decision-making by combining computational intelligence with managerial expertise [4], [11].

Literature Review:

Enterprise intelligence has evolved from traditional Business Intelligence (BI) systems focused on historical reporting to advanced analytics platforms incorporating predictive and prescriptive capabilities [6], [13]. Prior research highlights that data-driven organizations outperform their peers in profitability and operational efficiency [2], [12]. However, scholars also note limitations in legacy BI systems, including delayed insights, static dashboards, and limited decision automation [6].

Recent studies emphasize AI's role in overcoming these limitations through machine learning algorithms, natural language processing, and intelligent automation [1], [9], [14]. AI-driven decision support systems have been shown to improve forecasting accuracy, risk assessment, and scenario planning [5], [6]. Nonetheless, the literature also underscores concerns regarding explainability, trust, and ethical governance, particularly in high-stakes strategic decisions [7], [17], [18]. This paper builds upon existing scholarship by integrating AI capabilities within a strategic enterprise intelligence perspective [3], [4].

AI-Augmented Enterprise Intelligence: Conceptual Foundations:

AI-augmented enterprise intelligence refers to the integration of AI technologies into enterprise data ecosystems to enhance strategic insight generation and decision quality [4], [9]. Unlike traditional systems that merely present information, AI-augmented systems actively learn from data, adapt to changing conditions, and recommend optimal courses of action [8], [14].

Fig-b describes key enabling technologies include:
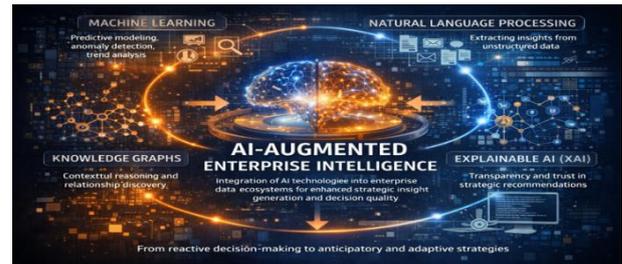
Fig-b AI- Augmented Enterprise Intelligence

The above fig-b represents:

- **Machine Learning:** For predictive modeling, anomaly detection, and trend analysis [8], [13].
- **Natural Language Processing:** For extracting insights from unstructured data such as reports, emails, and social media [1], [11].
- **Knowledge Graphs:** For contextual reasoning and relationship discovery [3].
- **Explainable AI (XAI):** For transparency and trust in strategic recommendations [7].

These components collectively enable enterprises to move from reactive decision-making to anticipatory and adaptive strategies [4], [9].

AI-Augmented Strategic Decision-Making Framework:

This study proposes a conceptual framework comprising four interconnected layers as shown in fig-c as frame work.

Fig-c: **AI-Augmented Strategic Decision-Making Framework**

1. **Data Layer:** Aggregates structured and unstructured data from internal and external sources [12], [13].
2. **Intelligence Layer:** Applies AI models to generate predictive, prescriptive, and cognitive insights [8], [9].
3. **Decision Layer:** Integrates AI recommendations with human judgment, domain expertise, and organizational values [3], [16], [19].
4. **Execution and Feedback Layer:** Implements decisions and continuously refines models through feedback loops [6].

The framework emphasizes human–AI collaboration, ensuring that strategic decisions remain aligned with organizational objectives while benefiting from AI's analytical capabilities [4], [11].

Strategic Benefits of AI-Augmented Enterprise Intelligence:

AI-augmented decision systems provide multiple strategic advantages:

- **Enhanced Foresight:** Improved demand forecasting, risk prediction, and market sensing [5], [9].
- **Decision Speed and Agility:** Real-time analytics enable rapid response to environmental changes [1], [4].
- **Consistency and Objectivity:** Reduced cognitive bias through data-driven recommendations [16], [19].
- **Strategic Alignment:** Continuous monitoring ensures alignment between strategy and execution [10], [11].

These benefits collectively contribute to sustainable competitive advantage in dynamic business environments [2], [4].

Challenges and Ethical Considerations:

Despite its potential, AI-augmented enterprise intelligence presents several challenges:

- **Data Quality and Integration:** Poor data governance undermines AI effectiveness [12], [13].
- **Explainability and Trust:** Black-box models may reduce managerial confidence [7], [18].
- **Ethical and Legal Risks:** Bias, privacy violations, and accountability issues require robust governance [17], [18].
- **Change Management:** Successful adoption demands cultural and organizational readiness [3], [4].

Addressing these challenges is critical for responsible and effective AI integration in strategic contexts [15], [17].

Future Research Directions:

Future research should explore empirical validation of AI-augmented decision frameworks across industries, examine longitudinal impacts on strategic performance, and develop standardized metrics for evaluating human–AI collaboration effectiveness [6], [9]. Additionally, advancements in explainable and ethical AI warrant deeper investigation to ensure sustainable enterprise adoption [7], [18].

Conclusion:

AI-augmented enterprise intelligence represents a transformative evolution in strategic decision-making. By synergizing human judgment with advanced AI capabilities, organizations can navigate complexity, uncertainty, and competition more effectively. Rather than replacing strategic leaders, AI serves as an intelligent partner, enhancing insight, agility, and strategic coherence. As enterprises continue their digital transformation journeys, AI-augmented decision-making will become a

cornerstone of intelligent and resilient organizations.

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Financial Innovations in Commerce and Management

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Abstract:

Financial innovation refers to the creation and popularization of new financial instruments, technologies, institutions, and processes that improve the efficiency of financial markets and business management. In recent decades, rapid technological advancement, globalization, and changing customer expectations have transformed the way commerce and management operate. Innovations such as digital payments, fintech platforms, blockchain technology, artificial intelligence, and new risk management tools have reshaped financial decision-making, business models, and competitive strategies. This paper examines the concept of financial innovation, its types, key drivers, applications in commerce and management, benefits, challenges, and future prospects.

Keywords: *Financial Innovation, FinTech, Digital Payments*

Introduction:

The modern business environment is highly dynamic and competitive, requiring organizations to adopt innovative financial practices to survive and grow. Financial innovation plays a crucial role in enhancing operational efficiency, reducing costs, improving access to capital, and supporting strategic management decisions. In commerce and management, financial innovations influence how firms raise funds, manage risks, process transactions, and interact with customers. With the integration of information technology into finance, traditional financial systems have evolved into more sophisticated, technology-driven models.

Concept of Financial Innovation:

Financial innovation can be defined as the development and implementation of new financial products, services, processes, or organizational forms that improve financial performance and economic outcomes. These innovations may involve:

➢ New financial instruments (e.g., derivatives, digital assets)
➢ New financial institutions or platforms (e.g., fintech companies)
➢ New processes and technologies (e.g., online banking, mobile wallets)
➢ New managerial and risk management practices

Types of Financial Innovations:

Product Innovations:

These involve the introduction of new financial products designed to meet specific customer needs.
Examples include:

➢ Credit cards and debit cards
➢ Mutual funds and exchange-traded funds (ETFs)
➢ Insurance-linked products
➢ Cryptocurrencies and digital tokens

Process Innovations:

Process innovations improve the efficiency and speed of financial operations. Examples include:

➢ Online and mobile banking
➢ Electronic fund transfer systems
➢ Automated clearing and settlement systems
➢ Robo-advisory services

Technological Innovations (FinTech):

Financial technology, or FinTech, integrates digital tools with financial services. Key areas include:

• Mobile payment systems (UPI, digital wallets)
• Blockchain and distributed ledger technology
• Artificial intelligence and big data analytics
• Cloud-based financial management systems

Institutional Innovations:

These involve new types of financial institutions or business models. Examples include:

➢ Peer-to-peer (P2P) lending platforms
➢ Crowdfunding platforms
➢ Neo-banks and digital-only banks

Financial Innovations in Commerce:

Financial innovations have significantly transformed commercial activities by:

➢ Enabling cashless and contactless transactions
➢ Expanding e-commerce through secure payment gateways
➢ Improving supply chain financing
➢ Enhancing customer convenience and satisfaction

Digital payment systems and online marketplaces have reduced transaction costs and geographical barriers, allowing businesses to reach global markets efficiently.

Role of Financial Innovations in Management:

In management, financial innovation supports better planning, control, and decision-making. Key contributions include:

➢ Improved financial reporting and transparency
➢ Advanced budgeting and forecasting tools
➢ Efficient working capital management
➢ Enhanced risk assessment and mitigation

Management information systems integrated with financial analytics help managers make data-driven strategic decisions.

Benefits of Financial Innovations:

Financial innovations offer several advantages:

➢ Increased efficiency and speed of transactions
➢ Reduction in operational and transaction costs
➢ Greater financial inclusion
➢ Improved access to capital for businesses
➢ Better risk management and diversification

Challenges and Risks:

Despite their benefits, financial innovations also present challenges:

➢ Cybersecurity threats and data privacy issues
➢ Regulatory and compliance concerns
➢ Technological complexity and implementation costs
➢ Financial fraud and misuse of digital platforms

Organizations must adopt strong governance and regulatory frameworks to manage these risks effectively.

Future Trends in Financial Innovation:

The future of financial innovation in commerce and management is likely to be driven by:

➢ Artificial intelligence and machine learning
➢ Blockchain-based smart contracts
➢ Embedded finance

- ➢ Sustainable and green finance innovations
- ➢ Increased regulatory technology (RegTech)

These trends will further integrate finance with strategic management and commercial operations.

Conclusion:

Financial innovations have become a cornerstone of modern commerce and management. By transforming financial products, processes, and institutions, they enhance efficiency, competitiveness, and strategic decision-making. While challenges related to security and regulation remain, the continued adoption of innovative financial solutions is essential for sustainable business growth. Organizations that effectively leverage financial innovations will gain a significant competitive advantage in the evolving global economy.

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Women's Role in Inclusive and Sustainable Economic Growth and Gender Equity in Indian Agriculture: Vision 2047

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Abstract:

In India, the agriculture sector dominates employment, with a 46.1 per cent share in 2023-24. Notably, the share of women in agriculture employment workforce is around 64.4 percent, underscoring the critical role of women and their contribution in ensuring food and nutrition security and supporting household income and impact on the agricultural economy. This paper examine vital role of women in Indian Agriculture and their contribution to inclusive and sustainable economic development. It reviews existing government policies and highlights the structural barriers to gender equity. The paper proposes an equitable approach for women's empowerment and gender justice aligned with the global sustainable development goals in the vision of Viksit Bharat by 2047.

Keywords: Women's role in agriculture, Gender equity, feminization of agriculture, women's contribution to agriculture, women empowerment

Introduction:

Recently, the United Nations declared 2026 the International Year of Women Farmers to raise awareness of the crucial roles women play across agricultural food systems, from production to trade, and promote actions to close the gender gaps and improve women's livelihoods worldwide. And underscore that Women farmers are central to food security, nutrition, and economic resilience. At the global level, women make up a significant share of the world agriculture workforce and play a central role in household food security and nutrition. and supporting Sustainable Development Goal SDG 1, No Poverty; SDG 2, Zero Hunger; SDG 5, gender equality; SDG 8, decent work and economic growth, and SDG 10, Reduce Inequalities. In 2021 at global level, 40 percent of women workers were engaged in agriculture food system, equal to men. In India, the agriculture sector employs 46.1 percent workforce in 2023-24. share of women workforce make up to 64.4

per cent in 2023-24. Underscore women are vital in agriculture productive activities.(NSO, 2025; UN Women, 2025) However, women's roles and contributions remain undervalued and unrecognized. women faces issues at both levels. At the domestic level, women often serve as unpaid family workers. And at the farm level, working conditions are irregular, informal, part-time, low-paid or unpaid work, and labour-intensive, hence women are more vulnerable human assets. They continue to face systemic barriers, including limited access to land ownership, credit, technologies, education, extension services, and participation in decision-making at all levels, hindering agricultural productivity and inclusive growth. (Tutej, 2000 ;Panda et al., 2025)

The paper aims to analyse women's role and contribution in Inclusive and sustainable economic growth and gender Equity in Indian Agriculture in the vision of 'Vikshit Bharat' by 2027. In this light research paper seeks answer the

following research questions: 1. How do women contribute to inclusive and sustainable agriculture growth? 2. What are the barriers faced by women in achieving gender equity in agriculture? 3 What policy approach are necessary for women farmer in Viksit Bharat Vision 2047?

Literature Review:

(Aayushi et al., 2024) studied the contribution of women in the agriculture sector and highlights the significant role played by Indian women in socio-economic development and supporting family income through farming activities. The study concluded that women's participation in farming activities is crucial for rural development and gender empowerment.

(Her Circle NGO, 2025) examined the critical role of women in Indian agriculture. The study emphasizes their contribution to food security and the rural economy. According to a study, women prefer to engage in sustainable farming practices, which highlights their role in environmental conservation and biodiversity preservation. However, women face socio-economic barriers that place them in vulnerable conditions. The study emphasises that empowerment of women in agriculture demands a comprehensive, equitable approach by providing agriculture education, financial and legal rights, and resources. The study concludes that women's participation in agriculture is crucial for food security, environmental sustainability, and rural development.

Various studies have recognised the role played by women in agricultural activities and their contribution to food security, crop cultivation, preserving seeds, livestock, environmental protection, supporting household income, and rural and sustainable agriculture development. These studies also underscored the various barriers and disabilities faced by women in agricultural farm activities and highlighted

policy reforms in rural women's empowerment. However, these reforms seem not align with long term vision of sustainable development goals and Indian long term vision of Viksit Bharat. The paper proposes an equitable approach for women's empowerment and gender justice aligned with the global sustainable development goals in the vision of Viksit Bharat by 2047.

Objectives of Research:

1. To examine the contribution to inclusive and sustainable agriculture growth in India
2. To study what are the barriers faced by women in achieving gender equity in agriculture
3. To provide a literature base for further study and policy approach are necessary for women farmer in Viksit Bharat Vision 2047?

Research Methodology:

The study is analytical in nature and is based on secondary data. Data is collected from various reputed sources, including government reports, NSO, NITI Aayog, UN Women, UNDP, FAO, research papers, and data various websites.

Women's Contribution to Indian Agriculture:

Figure 1: Women's Contribution in agriculture
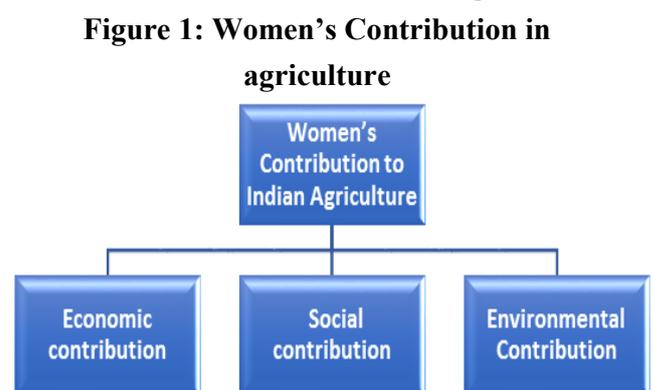
Source: Author self

i. Economic Contribution: The agriculture is the backbone of the Indian economy, playing a crucial role in national income and employment. The Agricultural sector supports about 46.1

percent of the population.(Ministry of Finance GOI, 2025). Women play a crucial role in agricultural activities; the share of working women in agriculture employment is stand around 64.4 percent in 2023-24 (PLFS, 2025). Women contribute to food security and economic security, with many women acting as breadwinner in their households and supporting rural economy and contributing to reducing poverty.(Sidh & Basu, 2011).Women's role Farmer Producer Organizations (FPOs) empower rural women, promote gender equity, and enhance their economic independence, ultimately fostering sustainable agricultural and rural development.

ii. Social Contribution: Agriculture is a way of life in rural India. and women are backbone of agrarian economy. They form two third of agricultural workforce hence their role in farming activities is vital. Various studies have underscored their contribution in preserving agrobiodiversity, and regarded as true custodians of agrobiodiversity. Women's decision in selecting, conserving, and sharing seeds suited to local soils and climates. Their knowledge of indigenous crop varieties, wild edibles, and medicinal plants sustains food diversity and resilience. Women's decisions on what to plant and preserve are guided not just by yield, but by taste, aroma, ritual value, and household needs - ensuring that biodiversity flourishes in both the field and the kitchen. (Women Farmers: Custodians of agri heritage and agrobiodiversity)

iii. Environmental Contribution: Research suggests that women, including those in indigenous communities, can play a crucial role in environmental preservation. This is often achieved through their traditional knowledge and agricultural methods, which have been developed and refined over generations (Singh et al., 2023) Women play crucial roles in agriculture, managing various tasks from livestock to crop cultivation, that empowering women in

agriculture is crucial for achieving gender equality, reducing poverty, and achieving sustainable development goals.(L G & N, 2024)

Challenges and Barriers:

Despite the vital role of women in farm activities, women are subject to various burdens and disabilities, as underscored by various studies**.** In India, the agriculture sector plays a dominant role in employment, with its share of 46.1 per cent in 2023-24. share of working women rising in agriculture employment, from 57.0 per cent in 2017-18 to 64.4 per cent in 2023-24; however, men's participation in agriculture decreased from 40.2 per cent to 36.3 per cent**.**(PLFS, 2025) As a result of agricultural crises, rural men had to seek other livelihood opportunities, causing them to migrate to urban areas in search of jobs, leaving women to do agricultural work, leading to the increasing feminization of agriculture. (MOSPI, 2025; Shukla et al., 2022; Mahendra Dev, 2012; Nair & Eapen, 2015; Padmaja et al., 2015). feminization in India is largely driven by out migration of men from rural areas.

However, increasing women's engagement in agricultural activities, it does not correlate with their socio-economic empowerment. Instead, this increasing trend is linked to poverty and may worsen the burden faced by rural women. And rural agriculture can be described as "feminization of agrarian distress " instead of "feminization of agriculture. (Pattnaik et al., 2018) Women face significant barriers such as limited access to productive resources, which hampers their productivity and recognition as active contributors (Subathra et al., 2021).According to Agriculture Census 2015-16, the percentage share of female operational holders is just 13.96% in 2015-16. The worse case is regarding SC and ST female grope, the share of female operational holders belonging to

SC and ST social group were estimated at 11.4% and 7.9 % respectively (Min. of Agri. GOI, 2016). Recent FAO reports underscore the scale of gender inequality and the disproportionate climate risks faced by women. the reports highlight the structural barriers limiting women's productivity, income, access to resources, and resilience. Reducing gender disparities in employment, education, and income could eliminate 52 percent of the food insecurity gap which is consistently higher among women. The unpaid care work performed by women and girls contributes at least $ 10.8 trillion to the global economy annually.

Road map for gender empowerment and gender equity in agriculture:

Approach to gender justice and equity can be achieved through following the ' **RVM trinity approach'**

1. Recognition 2. Valuing 3. Empowering. This approach is interlinked to each other and supports and promotes a virtuous circle of gender and social justice.

Figure. 2: 'RVM trinity approach'
1. Recognition 2. Valuing 3. Empowering
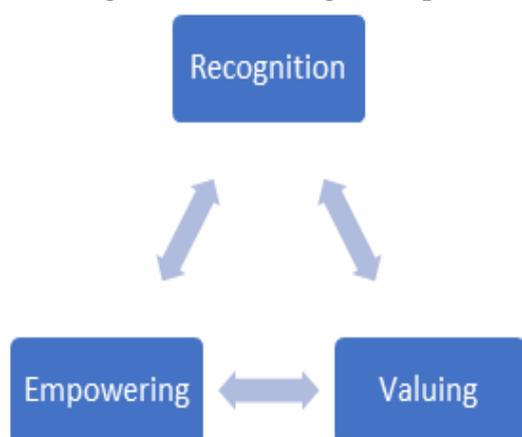
Source: Author self

1.Recognition of women as farmers: Roadmap for gender equity in agriculture starts with defining the women farmers. According to the United Nations, "Women farmers work in diverse roles across agrifood systems and come from all backgrounds: young and older women, Indigenous women, women in local communities, women with disabilities, and refugee and displaced women. They are smallholder producers, peasants, agricultural labourers, fishers and fish workers, beekeepers, pastoralists, processors, traders, women in agricultural sciences, rural entrepreneurs, traditional knowledge holders, and more—whether in formal or informal work, with or without land ownership." (Food and Agriculture Organization of the United Nations) However, in the Indian contest the definition of an Indian woman farmer is not given. Defining who a woman farmer is can help agencies and governments to formulate new policies that include equity and general justice. It is now important to examine gender norms that affect the recognition of women as legitimate farmers. UN declared 2026 International Year of the Woman Farmer 2026 to accelerate gender equality and women's empowerment in agrifood systems. To define who is a woman farmer is, understanding the status of women is crucial. According to UN women recognition of the status of women starts with gender equity. UN Women organisation highlights that "Gender equality is not only a basic human right, but its achievement has enormous socio-economic ramifications. Empowering women fuels thriving economies, spurring productivity and growth. (About UN Women | UN Women – Headquarters)

2. Valuing economic and social rights of women: Another crucial aspect of gender equity is valuing unpaid work and the economic and social rights of women. In India, when calculating national income, the government does not calculate the unpaid contributions made by women at the household and farm level activities. This is against the principle of natural justice by equal pay for equal work. Women often are paid less or are unpaid for their valuable contributions to farm-level activities. There is a need gender

based reforms to give women equal rights to economic resources; ownership and control over land, property, credit, technology, and natural resources. Women's integration in agricultural value chains and valuing their role and contribution entails gender equity.

3.Empowering Women: UN Women defines 'economic empowerment as a transformative, collective process through which economic systems become just, equitable and prosperous, and through which all women enjoy their economic and social rights, exercise agency and power in ways that challenge inequalities and level the playing field and gain equal rights and access to ownership of and control over resources, assets, income, time and their own lives.'(UN Women, 2024). Women's empowerment is, therefore, a dynamic, multi-dimensional process, which enables women to realise and execute their potential and powers in all spheres of life. (Anirban Mukherjee et al., 2020). Economic and social transformation of society in favour of gender equity must align with global sustainable development goals, Gender mainstreaming in NITI Aayog's Viksit Bharat vision, and national priorities

However, this approach of gender justice equity must be supported by monitoring and evaluation at local, national, and international levels. Data and statistics are vital for devising evidence-based policies and programmes on gender equality and women's empowerment.

Conclusion:

Women are Central to Inclusive and sustainable agriculture and rural development. An Indian vision of a developed India by 2047 cannot be possible without gender equitable, resilient, and inclusive policy reforms and gender sensitive approach. Institutional mechanisms, gender statistics, and data are essential for future courses of empowerment of women in agriculture. Indian

agriculture must align gender equity with sustainable development goal. The United Nations already declared 2026 as the International Year of Women Farmers to get more vision of women's contributions in this field. We need to devise new policy reforms and a strategy for this.

The paper suggests a new, broad approach to gender justice in the agriculture sector. Future research should focus on the impact of climate change on gender equity, as India is one of the 6 most vulnerable countries in the world, warned by climate risk Index, 2025. The FAO report also underscored women farmers' vulnerability due to climate extremes. The study concludes that Women play a crucial role in agriculture and participate in diverse farm activities. The study suggest RVM trinity approach: Recognition, Valuing, and Empowering women in the agricultural sector. Recognition of women as a farmer help to value their role in agricultural productivity and rural development. Valuing their contribution entails the right to productive resources, including access and ownership of land, credit, decision making, and finally social and economic independence, which in turn leads to gender equity and women's empowerment.

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Role of Artificial Intelligence in Library and Information Services

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Abstract:

Now a day's Artificial intelligence (AI) is one of the emerging trend and applications of computing in libraries. The present study explores the potential of AI to bring about transformation in library and information services. Artificial intelligence in libraries being used to improve library and information services, organize collections, personalize user experiences and automate tasks, with potential benefits for cataloging, resource discovery and user support. While it can enhance librarian's capabilities and assist with research, it also presents challenges related to implementation, funding, staff training and the need for responsible ethical guidelines to ensure equitable and private use. The application of Artificial intelligence in library has become pervasive. They include expert systems for book reading, reference services. Today artificial intelligence will greatly improve library and information services and will upgrade the heighten the relevance of libraries in an ever-changing digital age. The present study shows that how important role of artificial intelligence in library and information centers.

Keywords: Concept of Artificial Intelligence, Library and Information Services, Barriers of implementing AI in Library and Information Centers.

Introduction:

In 1955 John McCarthy coined the term 'Artificial Intelligence' that's why he is the father of Artificial Intelligence. Basically, AI is a branch of computer science. Most of the computer systems and mobile phones being developed today have AI features and we have probably used them not knowing that they are intelligent machine. Today AI touches most of our daily computing works like Entertainment, Education, Transportation, Sports, libraries etc. Main focus of artificial intelligence is perception, reasoning and action. AI offers many benefits like bridge in time, bridge in space, minimization of efforts, enhanced and immersive user experience in library delivery, maximization of effectiveness in form of improve services delivery, elimination of human errors in library operations. That's why AI is very important for today's libraries.

AI helps the librarian in realizing in the need for an improvement in the library operations and services. AI is transforming libraries by automating routine tasks, enhancing search and discovery through personalized recommendations, improving data analysis for collection development and user engagement. Today's fastest age AI is very useful for any libraries to give fastest and accurate services. AI also aids in library management like data analysis for collection development, digital preservation of materials and automated cataloging. Ultimately AI helps librarians become more efficient and accessible to user needs.

Role of Artificial Intelligence in Library and Information Services:

In enhanced accessibility, effective management, enhanced personalization, efficiency, relevance, effective services

automated services artificial intelligence plays a crucial role. Today's age is fastest age so to give within a time services AI is very necessary. Some of the areas in libraries AI can be used to improve library status. These are as follows.

1. Automatic indexing using AI.
2. In translation service AI can be used.
3. By automatic cataloging AI saves time of library staff.
4. In classification service which is very important part of library AI can be used to save time and efforts.
5. Intelligent document delivery services.
6. In digital preservation process AI can be used.
7. 24/7 virtual assistance AI is very important.
8. In collection management.
9. Automated reference services.
10. Advanced research support.
11. For improvement in accessibility AI can be used.
12. Advanced security systems.

Artificial intelligence systems will improve the performance of library services and reduce the rate of human errors and perform task faster than human being. Hence AI have great potential for improve status of library and information services. AI provides 24/7 assistance and creates more efficient, accessible for users and library staff. AI is an extensively used technology in library that can transform the best services in the age of Information Technology.

Barriers of Implementing AI in Library and Information Centers:

There are number of barriers to the implementation of AI in library and information centers. These includes Lack of finance, Staff skills, Data privacy and security, Lack of space, Lack of infrastructure etc. few of main is given below.

1. Implementation costs: The main obstacles of implementing AI are funding for infrastructure, software and maintenance. It requires high system development.

2. Lack of skilled staff: Library staff require new technical skills and ongoing professional development to effectively utilize and manage AI tools, creating a skills gap. Library staff also require training programme for updating of knowledge.

3. Data privacy: Here is another one drawback of implementation of AI. Libraries must navigate the complex responsibilities of managing large volumes of user data, ensuring compliance with privacy regulation and safe guarding sensitive information.

Lack of space, lack of power supply, lack of internet connectivity etc. there are many barriers in implementing AI in library and information centers.

Conclusion:

Present age is fastest and digital age. So, to improve status of libraries, to give fast services libraries must have implement new technologies like AI. AI has massive potential advantages like user structured information environment, smart document delivery service, intelligent gateways to online sources etc. AI can help library staff discover new and emerging trends like robotics, RFID etc. With these new emerging technologies libraries improve their status. So, in this way role of AI in library and information centers are very important for digitization of libraries. In short, we can say that AI is boon for library and information centers. Thus, AI holds great potential for library and information centers.

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Agricultural Credit as a Catalyst for Agricultural Transformation in Goa: An Empirical Analysis

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Abstract:

Agricultural credit is a critical driver of agricultural transformation, particularly in regions dominated by small and marginal farmers. In Goa, agriculture is characterized by fragmented landholdings, rising input costs, labour scarcity, and increasing dependence on non-farm income sources. Timely and adequate access to institutional credit enables farmers to adopt modern technologies, diversify cropping patterns, and improve productivity and farm incomes. This study empirically examines the role of agricultural credit in facilitating agricultural transformation in Goa using both primary and secondary data. Primary data were collected from 240 farmers across 04 selected talukas of Goa through structured questionnaires, while secondary data were sourced from government reports, NABARD and RBI publications, and scholarly studies. The findings reveal that institutional credit has a significant positive impact on farm income and technology adoption, though its influence on crop diversification and capital investment remains limited. Procedural delays, collateral requirements, inadequate loan amounts, and limited awareness of schemes continue to constrain effective credit utilization. The study concludes with policy recommendations to enhance the accessibility, efficiency, and developmental impact of agricultural credit in Goa.

Keywords: *Agricultural Credit, Agricultural Transformation, Institutional Finance, Rural Development, Goa*

Introduction:

Agriculture continues to play an important role in India's rural economy by providing livelihoods, food security, and raw materials for allied industries. Access to credit is a crucial input for agricultural development, enabling farmers to invest in seeds, fertilizers, irrigation, machinery, and new technologies. Agricultural transformation refers to the transition from traditional subsistence farming to a more productive, market-oriented, and technology-driven agricultural system.

In Goa, agriculture faces several structural and socio-economic challenges such as small and fragmented landholdings, declining participation of youth, labour shortages, rising wage costs, and vulnerability to climate risks. A large proportion of farmers practice agriculture as a subsidiary occupation, relying heavily on income from tourism, services, or business activities. Under these conditions, institutional agricultural credit assumes greater significance as it can ease liquidity constraints, reduce dependence on informal lenders, and encourage investment in modern farming practices.

Against this backdrop, the present study examines the role of agricultural credit as a catalyst for agricultural transformation in Goa. By

analysing patterns of credit access, utilization, and outcomes, the paper seeks to assess whether institutional finance has contributed to improvements in farm income, technology adoption, crop diversification, and capital formation.

Review of Literature:

A substantial body of literature highlights the importance of agricultural credit in promoting productivity and rural development. Rangarajan (2001) emphasized that institutional credit enhances farm productivity and reduces farmers' dependence on informal moneylenders. NABARD (2018) observed that increased credit availability is positively associated with the adoption of high-yielding varieties, mechanization, and crop diversification across Indian states.

Ghosh (2015) found that despite the expansion of institutional finance, small and marginal farmers face difficulties in accessing credit due to procedural delays, collateral requirements, and lack of awareness of government schemes. Patil and Desai (2019), focusing on Goa, reported that although the flow of agricultural credit has improved, its utilization remains suboptimal owing to limited awareness and logistical constraints. Kumar (2020) concluded that effective access to short-term and medium-term credit accelerates agricultural transformation by enabling farmers to invest in modern inputs and technologies.

Empirical studies by Feder et al. (1990) and Mishra et al. (2014) demonstrate a strong positive relationship between credit access, productivity, and farm income, while studies by Joshi et al. (2004) and Ellis (2000) suggest that crop diversification decisions are often influenced more by risk management and agro-climatic factors than by financial access alone. Overall, the literature suggests that while agricultural credit is a necessary condition for transformation, its effectiveness depends on complementary institutional and structural factors.

Objectives of the study:
1. To examine the impact of institutional agricultural credit on farm income and the adoption of modern agricultural technologies in Goa.
2. To assess the role of agricultural credit in influencing agricultural transformation indicators such as crop diversification and capital investment among Goan farmers.
3. To identify the major institutional and procedural constraints faced by farmers in accessing and effectively utilizing agricultural credit and to suggest policy measures for improving its effectiveness.

Research Design:

Primary data were obtained through a field survey of **240 farmers from Pernem, Bicholim, Sattari and Quepem**, selected using a **systematic random sampling technique**, comprising **120 credit availing** and **120 non-credit availing farmers**.

Secondary data were obtained from RBI and NABARD reports, Government of Goa publications, the Agricultural Census, and relevant research articles.

A combination of purposive sampling and simple random sampling was used to collect the primary data. The data were analysed using percentage analysis, averages, tables, correlation analysis, and regression models to assess the relationship between agricultural credit and indicators of agricultural transformation.

Limitations:
1. The **sample size and geographical coverage** are limited, which may restrict wider generalization of results.

2. The research primarily focuses on **institutional agricultural credit**, excluding informal sources of finance.

3. **External factors** such as climate variability, market price fluctuations, and policy changes could not be fully incorporated.

Profile of Goan Agriculture and Structural Challenges:

1. Profile of Goan Agriculture: Goan agriculture is dominated by horticultural and plantation crops such as cashew, coconut, mango, arecanut, banana, and vegetables. These crops offer relatively higher returns compared to traditional staples but also require higher investment and better risk management.

The total **net estimated sown area in Goa during 2023–24 according to Directorate of Agriculture Goa was 1,45,260 hectares**, reflecting limited but diversified agricultural land use. Among plantation crops, **cashewnut occupied the largest area with 57,001 hectares**, making it the most dominant crop in terms of land use. **Coconut** covered **26,782 hectares**, highlighting its widespread cultivation across the state. **Arecanut** occupied a comparatively smaller area of **2,099 hectares**, mainly in homestead gardens. Among food crops, **paddy** was grown on **32,477 hectares**, underlining its importance as the principal staple crop of Goa. However, the area under **other cereals, pulses, and oilseeds** was only **3,945 hectares**, indicating limited cultivation of these crops. Horticultural crops showed moderate land use, with **garden crops covering 11,930 hectares** and **vegetable cultivation spread over 8,689 hectares**, reflecting a gradual shift toward high-value crops. The area under spices and minor crops was relatively small. **Pepper** was cultivated on **868 hectares**, **tree spices on 266 hectares**, and **kokum on just 95 hectares**. **Sweet potatoes** occupied only **88 hectares**, showing their marginal role. Among commercial crops, **sugarcane covered 446 hectares**, while **oil palm**, an emerging crop, occupied **574 hectares**.

2. Production under principal crops for the year 2022-23 As per the Directorate of Agriculture Goa, 2022–23, **paddy** recorded the highest estimated production in Goa at **132,594 tons**, making it the most important food crop in the state. **Vegetable cultivation** produced **97,817 tons**, while **garden crops** accounted for **84,226 tons**, showing the strong contribution of horticulture to agricultural output. Among plantation crops, **coconut** production was **163.10 million nuts**, indicating its major economic and household importance. **Cashewnut** production stood at **25,800 tons**, supporting processing and export activities, while **arecanut** contributed **3,963 tons**. In the case of commercial crops, **sugarcane** recorded a production of **30,496 tons**, mainly for local processing, whereas **oil palm** produced **1,392 tons**, reflecting its limited but growing cultivation. Production of spices and minor crops was relatively low, with **pepper at 418 tons**, **tree spices at 19 tons**, **kokum at 848 tons**, and **sweet potatoes at 254 tons**. **Other cereals, pulses, and oilseeds** together accounted for only **3,294 tons**, highlighting Goa's dependence on other states for these crops.

3. Structural Characteristics of Goan Agriculture: A defining feature of agriculture in Goa is the predominance of small and fragmented landholdings. According to the Goa Agricultural Census (2015–16), nearly 80 per cent of operational holdings are below one hectare. Agriculture is largely pursued as a part-time activity, with farmers depending on non-farm income sources. The state also faces acute labour shortages and rising wage costs, reducing profitability.

4. Productivity and Climate Risks: Agricultural productivity in Goa remains below the national average due to fragmentation, part-time farming, and limited mechanization. Climate variability, erratic rainfall, and limited crop insurance coverage further increase production risks, discouraging long-term investment.

5.Institutional Credit Delivery System in Goa: The agricultural credit delivery system in Goa comprises cooperative banks and commercial banks with the NABARD-supported initiatives. Policy measures by RBI and NABARD have focused on improving outreach, simplifying procedures, and strengthening repayment culture.

6. State and Central Credit Subvention Schemes in Operation: The flow of credit to Goan agriculture is substantially driven by state and central interest subvention mechanisms, designed to reduce the effective cost of borrowing.

Goa State Interest Subsidy Scheme (ISLAAA)The Government of Goa implements the "Interest Subsidy on Loans for Agriculture and Allied Activities" scheme, which targets bonafide agriculturists, individuals in the animal husbandry sector, and the fisheries sector. The scheme provides loans up to a maximum amount of ₹5,00,000 per individual beneficiary for a maximum period of five years. The significant financial incentive is a substantial 4% interest subsidy provided to farmers who promptly repay their short-term loans. For long-term loans, the subsidy covers the difference between a reference rate of 4% and the bank's normal rate, capped at a maximum subsidy limit of 8%.

Central Government Interest Subvention Scheme (ISS): This state-level support is complemented by the central government's Interest Subvention Scheme, primarily delivered through Kisan Credit Cards (KCC). Under this framework, banks typically provide crop loans up to ₹3.00 lakh at a rate of 7% per annum. An additional 3% incentive is extended by the Government of India upon prompt repayment, effectively lowering the borrowing rate for compliant farmers to just 4% per annum.

The policy design of both major subsidy schemes places a powerful emphasis on prompt repayment behavior. While this mechanism is highly effective in managing Non-Performing Assets (NPAs) and improving the overall recovery climate—a critical objective given the seriousness of NPA buildup—it creates an inherent conflict. The policy effectively measures the financial behavior of debt service rather than the desired productive outcome of agricultural output enhancement and capital formation.

Impact of Agricultural Credit on Agricultural Transformation:

1.Impact on Farm Income:

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.319[a]	.102	.090	88966.296
a. Predictors: (Constant), Presence of agricultural machinery and equipments, No. of crops, Loan Avail				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	211578870298.739	3	70526290099.580	8.910	.000[b]
	Residual	1867940425534.591	236	7915001803.113		
	Total	2079519295833.330	239			
a. Dependent Variable: Annual income from farming						
b. Predictors: (Constant), Presence of agricultural machinery and equipments, No. of crops, Loan Avail						

The above models examines the effect of credit access on annual farm income using an Ordinary Least Squares (OLS) regression framework. The overall model is statistically significant (F = 8.91, p < 0.001), indicating that the explanatory variables jointly influence farm income. The coefficient of determination (R^2 = 0.102) suggests that approximately 10.2 percent of the variation in farm income is explained by loan availability, number of crops grown, and ownership of agricultural machinery. Although modest, this explanatory power is reasonable for cross-sectional farm-level data where income is influenced by multiple unobserved agro-climatic and institutional factors.

Coefficients[a]								
		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	16506.838	11989.554		1.377	.170		
	Loan Avail	57304.853	15760.489	.308	3.636	.000	.531	1.883
	No. of crops	4116.779	3901.087	.073	1.055	.292	.804	1.244
	Presence of agricultural machinery and equipments	-3695.119	5839.502	-.050	-.633	.527	.621	1.610
a. Dependent Variable: Annual income from farming								

Among the explanatory variables, access to credit emerges as the most influential determinant of farm income. The estimated coefficient for loan availability is positive and statistically significant (B = 57,304.85; p < 0.001), implying that farmers who have access to credit earn, on average, about ₹57,000 more per year compared to those without access. This finding strongly supports the liquidity constraint theory, which posits that access to financial capital enables farmers to purchase quality inputs, adopt improved practices, and smooth production-related expenditures, thereby enhancing income (Feder et al., 1990; Besley, 1994).

In contrast, the number of crops grown does not show a statistically significant effect on income. This indicates that diversification alone does not necessarily translate into higher farm earnings, particularly when diversification is undertaken as a risk-coping strategy rather than a profit-maximizing decision. Similar results have been reported in earlier studies, which argue that diversification without adequate market access or productivity gains may dilute income benefits (Barrett et al., 2001).

The presence of agricultural machinery also does not exhibit a significant direct effect on income. This may be attributed to underutilization of machinery, small operational landholdings, or the prevalence of custom hiring services, which reduce the need for ownership. These findings are consistent with the induced innovation hypothesis, which suggests that capital investments yield income gains only when complementary factors such as scale and skills are present (Hayami and Ruttan, 1985).

2.Impact of Credit on Crop Diversification:

The Negative Binomial regression results indicate that access to credit does not have a statistically significant effect on the number of crops cultivated. None of the covariates, including loan availability, farm income, or machinery ownership, significantly explain variations in crop diversification. The significance of only the intercept term suggests

that diversification patterns are largely driven by factors outside the scope of financial access.

From a theoretical perspective, this finding aligns with risk management theory in agriculture. Farmers often diversify crops to hedge against production and price risks rather than to maximize income, especially in rain-fed and resource-constrained environments (Ellis, 2000). Moreover, agro-climatic conditions, soil characteristics, and local consumption needs may impose rigid constraints on diversification choices, thereby limiting the role of credit. Empirical studies in developing country contexts similarly report weak or insignificant links between credit access and crop diversification (Joshi et al., 2004).

3.Impact of Credit on Technology Adoption:

Model Fitting Information				
	Model Fitting Criteria	Likelihood Ratio Tests		
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	338.516			
Final	211.908	126.608	8	.000

Pseudo R-Square	
Nagelkerke	.507

The model employs multinomial logistic regression to analyze the determinants of technology adoption, categorized as traditional methods, modern methods, and a combination of both. The model demonstrates strong explanatory power, as indicated by the likelihood ratio chi-square statistic ($\chi^2 = 126.61$; $p < 0.001$) and a high Nagelkerke R^2 value of 0.507.

Loan availability is found to be the most critical determinant of technology adoption. Farmers without access to credit are significantly less likely to adopt modern or mixed cultivation methods compared to traditional practices ($p < 0.001$). This result is consistent with adoption theory, which emphasizes that liquidity constraints and risk aversion are major barriers to the uptake of new technologies (Feder and Umali, 1993).

The strong influence of credit reflects its role in reducing upfront investment costs, enabling the purchase of improved seeds, fertilizers, and irrigation services. The finding corroborates earlier empirical evidence showing that institutional finance accelerates technological diffusion in agriculture by easing capital constraints and reducing perceived risk (Mishra et al., 2014).

4.Impact of Credit on Capital Investment: The Negative Binomial regression model results indicate that loan availability does not have a statistically significant effect on machinery ownership. This finding suggests that short-term or consumption-oriented credit may not be sufficient to induce long-term capital investments. From a theoretical standpoint, this aligns with the distinction between working capital and fixed capital investment in agricultural finance. While short-term credit supports variable input use, capital investment decisions depend on long-term expectations, scale of operation, and access to specialized investment credit (Binswanger and Rosenzweig, 1986).

Additionally, the growing prevalence of custom hiring centers and shared machinery services reduces the necessity of ownership, particularly among small and marginal farmers. This institutional arrangement weakens the direct link between credit access and capital accumulation, as observed in several recent

studies on mechanization in developing agriculture (Pingali, 2007).

Specific Constraints to Institutional Credit Access in Goa:

Despite the extensive financial infrastructure and substantial interest subsidies, small and marginal farmers, along with non-landowning producers like tenant farmers and sharecroppers, frequently experience difficulties accessing institutional credit reliably.

Table 2: Problems Faced by Farmers in Accessing Institutional Credit

Sr. No.	Problems faced by the farmers in accessing the institutional credit	Responses (Percentage)
1.	Lengthy and time-consuming loan procedures	90.83
2.	Excessive paperwork and documentation requirements	66.67
3.	Delay in loan sanction and disbursement	77.50
4.	Frequent visits required to banks	56.67
5.	Lack of guidance from bank officials	62.50
6.	Eligibility and Collateral Problems	68.33
7.	Inadequate loan amount sanctioned	81.67
8.	Lack of awareness about government credit schemes	45.00
9.	Difficulty in understanding banking terms and conditions	85.83

Source: Primary Data

The data shows that farmers face **major procedural and institutional barriers** in accessing institutional credit. The most serious problems are **lengthy loan procedures (90.83%)**, **difficulty in understanding banking terms (85.83%)**, and **inadequate loan amounts (81.67%)**. **Delays in loan sanction and disbursement (77.50%)** further reduce the usefulness of credit. Issues related to **collateral and eligibility (68.33%)**, **excessive paperwork (66.67%)**, and **lack of guidance from bank officials (62.50%)** also significantly affect access. Overall, the findings indicate that institutional credit systems are **complex, time-consuming, and insufficiently farmer-friendly**, limiting effective financial inclusion.

Conclusion:

This study examined agricultural credit as a catalyst for agricultural transformation in Goa, with specific reference to farm income, technology adoption, transformation indicators, and institutional constraints.

In line with the **first objective**, the empirical analysis clearly establishes that institutional agricultural credit has a significant and positive impact on farm income and the adoption of modern agricultural technologies. Farmers with access to credit were found to earn higher farm incomes and were more likely to adopt modern or mixed farming practices. This confirms that credit helps overcome liquidity constraints, enables timely purchase of quality inputs, and reduces the risks associated with technological adoption.

Addressing the **second objective**, the study finds that the role of agricultural credit in influencing broader transformation indicators such as crop diversification and capital investment is limited. Crop diversification in Goa appears to be driven more by agro-climatic conditions, risk management considerations, and market access rather than by credit availability

alone. Similarly, access to credit does not significantly influence ownership of agricultural machinery, largely due to small and fragmented landholdings, reliance on custom hiring services, and the predominance of short-term credit.

With respect to the **third objective**, the study identifies several institutional and procedural constraints that hinder effective access to agricultural credit. Lengthy loan procedures, delays in sanction and disbursement, complex documentation, collateral requirements, inadequate loan amounts, and limited guidance from bank officials continue to restrict the full developmental potential of institutional finance in Goa.

Overall, the findings suggest that while agricultural credit is a necessary condition for agricultural transformation in Goa, it is not sufficient on its own. Credit-led development strategies must be complemented by non-financial interventions such as extension services, market support, risk mitigation through insurance, and investment-oriented credit products

Policy Recommendations:

1. Simplification of loan procedures and reduction in documentation requirements.
2. Relaxation of collateral norms for small and marginal farmers.
3. Strengthening awareness and financial literacy programmes related to credit schemes.
4. Greater coordination between banks, agricultural extension services, and insurance providers.
5. Promotion of long-term and investment-oriented credit products aligned with farm modernization needs.

By addressing these issues, agricultural credit can more effectively function as a catalyst for sustainable agricultural transformation and rural development in Goa.

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From Logic of Survival to Logic of Negotiation: Generational Shifts in Diasporic Identity in Faqir's My Name is Salma and Darraj's The Inheritance of Exile

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Abstract:

This paper offers a comparative analysis of Faqir's My Name is Salma (2007) and Darraj's The Inheritance of Exile (2007), arguing these two contemporaneous novels represent distinct, generationally-defined modes of narrative production within Arab Anglophone literature. Beyond a thematic comparison, this study develops a novel analytical framework distinguishing between a "logic of survival" and a "logic of negotiation." Drawing on Caruth's trauma theory, the paper contends that Faqir's novel exemplifies a logic of survival, where the narrative is structured by trauma as an "unclaimed experience," forcing the first-generation exile into a solitary re-inscription of the self against life-threatening patriarchy. Conversely, applying Bhabha's concept of the "Third Space," the analysis treats Darraj's collection as a prime example of a logic of negotiation. The narrative focus shifts to the second generation, whose identities are forged relationally and communally within the liminal, negotiated spaces of Arab-American life. This paper demonstrates how Faqir's text chronicles the inscription of trauma upon the body and psyche, while Darraj's maps the complex cultural semiotics of belonging. Ultimately, the framework offers a valuable heuristic for understanding the evolution of diasporic narrative, moving from addressing the initial rupture of displacement to charting the chronic condition of inherited cultural hybridity.

Keywords: Arab Anglophone Literature, Diasporic Identity, Generational Shift, Trauma Theory, Post-Colonial Theory, Homi Bhabha, Third Space, Literary Criticism

Introduction:

The literature of the Arab diaspora is profoundly shaped by what Edward Said famously described as the "unhealable rift" of the exilic condition, a state of being perpetually "out of place" (Said, 2000, p. 173). Narratives emerging from this diaspora have historically chronicled the pain of displacement, the politics of identity, and the friction between homeland and hostland. Within this tradition, the works of women writers have carved out a critical space, interrogating the ways gender intersects with cultural and national alienation.

Faqir's *My Name is Salma* and Darraj's *The Inheritance of Exile*, both published in 2007, are exemplary texts in this regard. While both explore the lives of displaced Arab women, a simple thematic comparison of their work risks obscuring a more fundamental divergence in their narrative projects—a divergence rooted in generational proximity to the initial trauma of migration. This paper argues that these two novels are best understood through a novel analytical framework that distinguishes two essential narrative modes: a logic of survival and a logic of negotiation.

Faqir's *My Name is Salma*, centred on a first-generation refugee fleeing an honour killing, exemplifies a logic of survival. Its narrative logic is dictated by the overwhelming force of trauma, a concept analysed through the lens of Cathy Caruth's work on the "unclaimed experience." In this mode, identity is a solitary project of reconstruction necessitated by a violent break with the past. In contrast, Darraj's collection of stories, focusing on second-generation Palestinian-American women, embodies a logic of negotiation. Drawing on Homi K. Bhabha's theory of the "Third Space," it is argued that these narratives depict identity not as a reaction to singular trauma but as an ongoing process of cultural translation and negotiation forged within the ambivalent, hybrid spaces of diasporic life. By examining these distinct logics, the paper traces a crucial developmental trajectory in diasporic literature, moving from narratives of surviving the initial rupture to narratives of inhabiting the chronic rift.

The Logic of Survival: Trauma and Unclaimed Experience in *My Name is Salma*:

My Name is Salma is a raw testament to the psychic and physical violence of forced exile. For the protagonist Salma, displacement is not a choice but a flight from a death sentence issued by a patriarchal order that equates female sexuality with family honour. The novel's narrative structure is not linear but profoundly cyclical, fragmented by flashbacks and intrusive memories that disrupt the present. This narrative disjunction is a hallmark of the logic of survival, aligning perfectly with Cathy Caruth's formulation of trauma.

For Caruth, trauma is not simply the memory of a terrible event but a "history that literally has no place" (Caruth, 1996, p. 5), an experience so overwhelming it cannot be integrated into conscious memory. It returns,

instead, as a "literal return of the event," haunting the survivor through flashbacks and nightmares (Caruth, 1996, p. 151). Salma's story is a case study in this phenomenon. Her life in Exeter is perpetually invaded by the ghosts of her past: the face of her brother, the smell of the desert, the lost presence of her baby. These are not nostalgic recollections but traumatic inscriptions. Faqir's prose vividly performs this psychic state: "The past had a long reach. It had wound its arms around my waist, its legs around my ankles and was pulling me back, down, into a bottomless pit" (Faqir, 2007, p. 88).

This is the voice of a consciousness under siege. As scholar Nadia Al-Hassan notes, the narrative structure in forced migration literature "often mirrors the shattered psyche of the protagonist. Linearity is a luxury the traumatized self cannot afford" (Al-Hassan, 2015, p. 78), further solidifying Salma's experience. Salma's journey is thus less about assimilating into British society and more about the fundamental struggle to process an experience that has, in Caruth's terms, been left unclaimed.

The ultimate symbol of this traumatic erasure and the subsequent struggle for reconstruction is her name. Stripped of her birth name, she is rechristened "Salma," an identity given to her by the asylum system. This act signifies the violent severance from her past self. Her project becomes the lonely task of inhabiting this new name, of building a person from the fragments left behind. This is powerfully encapsulated in her own metaphor: "I was a green olive, plucked from the mother tree, pressed for my oil, then thrown away" (Faqir, 2007, p. 112). A close reading of this metaphor reveals the core of her traumatic experience. "Plucked" suggests a violent, premature separation; "pressed for my oil" speaks to the brutal extraction of her perceived value (her virginity, her honour) for the benefit of the patriarchal collective; and "thrown

away" confirms her ultimate disposability. This is not a narrative of cultural blending but of a desperate attempt to grow new roots after being violently uprooted. Her story, a quintessential example of the logic of survival, is about the arduous, solitary labour of transforming the literal return of the event into a liveable, narratable memory.

The Logic of Negotiation: Inhabiting the Third Space in *The Inheritance of Exile:*

If Faqir's novel is about surviving a traumatic break, Darraj's *The Inheritance of Exile* is about navigating the chronic condition of being the product of that break. For the second-generation protagonists—Nadia, Aliyah, Hanan, and Reema—exile is not a memory but an inheritance. They are citizens of what Homi K. Bhabha calls the "Third Space of Enunciation," a liminal and ambivalent site where cultural meaning is constantly negotiated rather than fixed (Bhabha, 1994, p. 54). Their identities are not stable or whole but are in a continuous process of "translation," caught between the Palestinian culture of their parents and the American culture of their birth.

This defines the logic of negotiation. The novel's polyvocal structure, giving voice to four different women, immediately signals a departure from the singular, traumatized consciousness of Faqir's Salma. Darraj presents a community, not an isolated survivor, and their struggles are relational and social. The central conflicts erupt at the sites of cultural translation, where symbols carry contested meanings. The most potent example is the dispute over fashion. The daughters' adoption of American styles like "ripped jeans and... piercings" becomes a flashpoint for intergenerational conflict, as their mothers demand they "look respectable, and not like they live on the streets" (Darraj, 2007, p. 58).

Within a Bhabhian framework, this is more than a simple disagreement over clothing. It is a semiotic struggle within the Third Space. For the daughters, the ripped jeans are a signifier of belonging and integration into American youth culture. For the mothers, whose identities were forged in a different context, this same signifier is read as a betrayal of cultural heritage and a mark of social deviance. As Lisa Suhair Majaj observes, for many Arab-American youth, "the performance of identity through cultural symbols like dress and language becomes a primary means of negotiating the often contradictory demands of heritage and citizenship" (Majaj, 1996, p. 112). The meaning of the clothing is not inherent; it is created and contested in the ambivalent space between generations and cultures.

This logic of negotiation is also evident in the varied relationships of the characters to their Palestinian heritage. It is not a monolithic entity but a fluid concept they engage with differently. Hanan feels alienated from it, while Aliyah embraces a form of it through her decision to wear the hijab—a choice that is itself a complex act of negotiation, signalling piety to some, defiance to others, and a personal claim to a hybrid identity. Unlike Salma, who must reconstruct a self from ground zero, Darraj's characters are engaged in a constant, dialogic process of assembling an identity from the cultural materials available to them. Their stories are not about surviving the past, but about negotiating its meaning in the present.

Conclusion:

Reading Faqir's *My Name is Salma* and Darraj's *The Inheritance of Exile* through the proposed framework of a "logic of survival" and a "logic of negotiation" reveals a significant developmental trajectory in the narrative landscape of the Arab diaspora. Faqir's text, grounded in the traumatic logic of the first-

generation refugee experience, is a powerful example of survival literature. It is a narrative of inscription, where the primary focus is on the body and psyche as sites upon which violence and displacement are written. Its power lies in its unflinching portrayal of the struggle to make an "unclaimed experience" narratable, to build a coherent self after a complete psychic rupture.

Darraj's collection, in contrast, represents a generational shift. Moving into the complex terrain of the second generation, it charts a logic of negotiation. Here, the narrative is not driven by a singular trauma but by the chronic ambivalence and creative potential of the Bhabhian Third Space. It is a literature of translation, exploring the ways identity is continuously performed, contested, and remade through social interaction and cultural negotiation. The conflicts are subtler but no less profound, shifting from the existential threat of annihilation to the intricate challenges of crafting a meaningful existence within a hyphenated identity. This distinction is not a value judgment but an analytical tool. Both narrative modes are vital for a comprehensive understanding of the diasporic condition. The logic of survival gives voice to the foundational trauma of displacement, while the logic of negotiation explores the long-term, evolving legacy of that displacement. Together, Faqir and Darraj demonstrate that the house of diaspora has many rooms, and by developing new critical frameworks to understand their distinct architectures, a more delicate appreciation is gained for the complex, ongoing story of what it means to be out of place.

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The Rural Entrepreneurship In Region of Marathwada

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Abstract:

    other reasons listed, entrepreneurship is encouraged by competition to do things differently and more effectively. Numerous issues confront rural business owners, including a shortage of managerial and trained labor, inadequate agribusiness infrastructure, marketing issues, and a lack of knowledge Entrepreneurship is not just a term or an act of establishing an enterprise to create more jobs and support the local economy. From a policy point of view, entrepreneurship is seen as a tool or rather solution to various socio-economic issues. Entrepreneurship refers to the process of establishing a new enterprise and running it sustainably in the long run, all the risks within are managed to reap benefits in the long term. Rural entrepreneurship bears more importance for a country like India, where more than half of our population is still residing in rural areas. For the study in 2020–21, the researcher gathered online data from 150 Marathwada respondents using Google. Researchers believe that raising awareness of business education among young people is the primary factor contributing to the decline in entrepreneurship, among other factors. In addition to the several about a career in agro entrepreneurship.

Keywords: Entrepreneurship, Rural entrepreneurship, Problems, Stores, Confidence, Awareness.

Introduction:

An entrepreneur is effective in controlling of commercial undertaking, one who undertakes a business or an enterprise. Entrepreneurial development nowadays has become very significant, given its being a key to economic development. The objectives of industrial development, regional increase, and employment age group depend upon entrepreneurial development

Concept Of Rural Entrepreneurship:

India's canvas for entrepreneurship is very large and unexplored, within it rural entrepreneurship is hardly touched upon. Rural entrepreneurship refers to entrepreneurial activity with its roots in rural areas. These enterprises hold great potential to strengthen various business ecosystems, involve multi-functional stakeholders and shape different markets to contribute to country's economic growth. India's two-third population is still living in rural areas and is largely dependent upon agriculture and allied activities. The situation when traditional activity is not adding enough money to pockets and business dependent upon rural areas are making money, without distributing it to real producers, there lies an opportunity for some high risk appetite individuals to establish enterprises in rural areas and take better share of income for their produce. Rural entrepreneurship also means rural industrialization.

"The real solution to the problems of this country is production by its masses and not mass level production." - Mahatma Gandhi

Objectives:

1. To understand the importance of Marathwada's rural entrepreneurs
2. To ascertain the issues facing Marathwada's rural entrepreneurs

Research Methodology:

There are eight districts in the Marathwada region: Beed, Chhatrapati Sambhajinagar (Aurangabad), Jalna, Parbhani, Hingoli, Dharshiv (Osmanabad), Nanded, and so on. Primary and secondary sources are the foundation of the research. Each form of data has been utilized by the researcher. One hundred and fifty Marathwada respondents provided the researcher with online data via Google form

Types of Entrepreneurship:
Rural entrepreneurship can be categorized into four parts:
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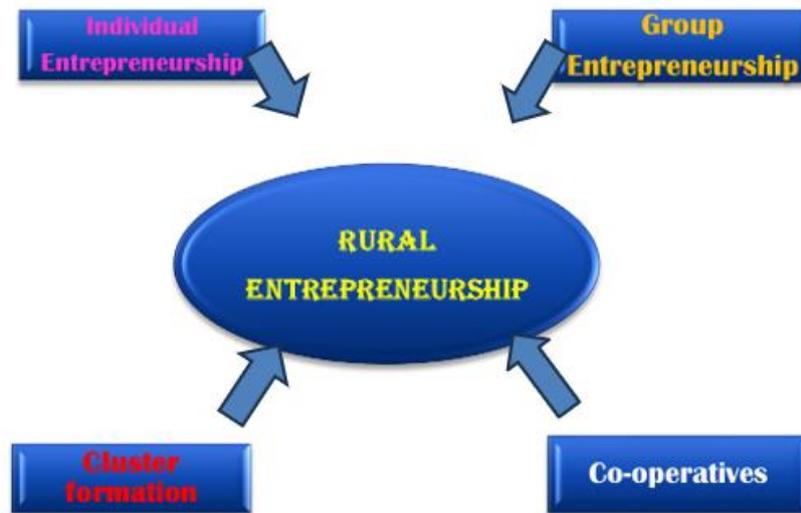
a) **Individual Entrepreneurship:** An individual decides to start an enterprise with his/her own resources, considering all risks and future returns. The individual is highly skilled and have good business acumen to run their enterprise profitably. In most of the cases, individuals belong to well-off families in communities

b) **Group Entrepreneurship:** A small group of individuals collaborate on the basis of their varied skills or resource mobilization, to start an enterprise. The management of these enterprises is bit more difficult than individual ones, due to shared responsibilities and uncertain decision-making process. For example, a local enterprise delivering all products and services related to sanitation can be set up by a group of like-minded individuals; this will help share losses and support in strengthening the overall sanitation value chain

c) **Cluster formation:** Clusters are defined as areas/regions where interrelated competitive firms and related institutions are inf found in concentration. Clusters in many cases, develop in a region where economic activity in a specific industry, sector or supply chain is concentrated. Enterprises can be established in cluster formation if many individuals or small groups like self-help groups SHGs or Producer Groups PGs are participating in the same livelihood activity the good thing of this category is economies of scale and a large supply base

d) **Co-operatives:** Cooperatives are simply an autonomous associations of persons united voluntarily to meet their common economic social and cultural needs and aspirations through jointly-owned enterprise entrepreneurship when taking into consideration the institutional framework of cooperative to satisfy the socioeconomic and cultural needs and aspirations of a group of members is termed as co-operative entrepreneurship

Scope Of the Study:

The issues facing Marathwada's rural entrepreneurs are the subject of this study. The scope of the current study was our own constraints when conducting the investigation.

This research is restricted to the Marathwada region.

Policy Challenges:

Major issues of difficulties in Lack of infrastructure facility regarding rural marketing in Marathwada, issues that Youth are not aware of; Issues of devolution of native and obsolete technology, Electricity, water, and technology are in short supply, they will not power, Industry fear and they do not have sufficient information about finance.

Conclusion:

Maharashtra is known for being a leading state in the nation, yet its progress has also been uneven. Youth in both urban and rural areas are unaware of this option.

They have issues with their infrastructure, lack of water, energy, and technology, as well as issues with willpower and inadequate training.

A well-regulated market ought to exist, and in this regard, government collaboration is also necessary.

Suggestion:

According to Maximum Entrepreneur, they encounter real marketing-related issues. Other challenges included inadequate marketing resources, arbitrators' exploitation, and a lack of knowledge about market rates. Youth should be given awareness. State and corporate agencies ought to provide solutions in this regard.

The government ought to set aside money in a separate fund and allow banks to easily lend money to rural business owners. Entrepreneurs in rural areas should be supported and encouraged to establish marketing cooperatives in their communities.

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The Digital Economy in India: Opportunities, Challenges, and Growth Prospects

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Abstract:

Over the past decade, India's digital economy has emerged as a key driver of economic growth, innovation, and social transformation. Initiatives like Digital India, coupled with rising internet penetration, affordable smartphones, and digital payment platforms such as UPI, have rapidly expanded the nation's digital ecosystem. This transformation has enhanced financial inclusion, strengthened e-governance, boosted entrepreneurship, and improved the productivity of the MSME sector, while making services more accessible in both urban and rural areas. The digital economy presents significant opportunities for job creation, the rise of startups, and better access to education and healthcare. Yet, challenges persist, including regional and social digital divides, cybersecurity risks, data privacy concerns, limited digital skills, and inadequate infrastructure in remote regions. Addressing these challenges through strategic policy support and harnessing emerging technologies like artificial intelligence and cloud computing is crucial to sustaining and accelerating the growth of India's digital economy

Keywords: Digital Economy, Digital India, Financial Inclusion, Digital Infrastructure, Economic Development

Introduction:

The process of digitalization in India has evolved through various stages. The 1990s saw reforms in the information technology and telecommunications sectors, while the 2000s witnessed the expansion of e-governance and online public services. However, the launch of the 'Digital India' initiative on July 1, 2015, provided a formal and decisive impetus for India's journey towards a digitally empowered economy. This initiative focused on making digital infrastructure available as a basic utility for citizens, providing government services electronically, and increasing digital literacy.

The increasing use of smartphones, affordable internet services, and digital identity systems like Aadhaar strengthened the foundation of the technology-driven economy. Digital payment systems like the Unified Payments Interface (UPI) accelerated financial inclusion and made transactions faster and more secure. The Jan Dhan-Aadhaar-Mobile (JAM) trinity increased transparency in governance and made Direct Benefit Transfer (DBT) more effective.

After 2015, the expansion of digitalization was not limited to urban areas but reached rural and semi-urban areas as well. This increased efficiency in sectors such as MSMEs, education, healthcare, agriculture, and logistics. The COVID-19 pandemic further accelerated the adoption of digital technologies, leading to a significant increase in the use of online education, work-from-home, digital payments, and e-services.

Today, India's digital economy is a major driver of productivity, innovation, and inclusive economic growth. With the government's proactive role, a rapidly growing startup

ecosystem, and robust digital public infrastructure, the digital economy is expected to contribute significantly to the national income by 2030. Although challenges such as the digital divide, cybersecurity issues, and inclusion-related difficulties persist, digitalization is fundamentally transforming India's economic structure, governance, and development process.

Review of Literature:

Raihan (2024) examines the opportunities and challenges of the digital economy for sustainability at an international level. The study highlights key sustainability concerns such as electronic waste, high energy consumption, and environmental impacts associated with digital technologies. At the same time, it emphasizes the potential benefits of digitalization, including innovation, efficiency gains, and consumer empowerment. The author notes that these global insights are relevant to India, suggesting that while the digital economy offers significant growth and efficiency opportunities, careful management of environmental and social impacts is essential for sustainable development.

Desai (2024) has studied the growth of India's digital economy and its socio-economic implications. This research notes that digitalization has improved financial inclusion, employment opportunities, transparency, and access to various services. However, the study also reveals that challenges such as the digital divide, cybersecurity issues, and socio-economic inequalities can hinder inclusive and balanced development.

Bansal (2024) has studied India's digital transformation, which includes significant opportunities in the digital economy such as wider market access, increased use of digital services, and improved efficiency in economic activities. The study also highlights key challenges such as the digital divide,

infrastructure limitations, and cybersecurity risks, which prevent the equitable distribution of the benefits of digital growth. The research further notes that overcoming these challenges through policy reforms and skill development is essential to fully leverage the potential of India's digital economy.

Garg, Bindlish, and Kumar (2023) analyse the Digital India Scheme and highlight its role in strengthening digital infrastructure, improving internet connectivity, and enhancing digital literacy across India. The study emphasizes that the initiative aims to bridge the rural–urban digital divide, improve access to e-governance services, and promote inclusive economic growth. However, the authors note that challenges such as inadequate infrastructure, limited digital awareness, and unequal access to technology continue to hinder the full realization of the scheme's objectives.

Reserve Bank of India (RBI, 2023) report**,** highlights the Indian banking sector has witnessed significant growth in digital payments and fintech innovations. The increasing use of UPI, mobile banking, and digital wallets has made transactions faster, more transparent, and efficient, promoting financial inclusion, especially for underserved segments of the population. However, the report also highlights challenges such as cybersecurity, data privacy, and regulatory compliance. The study emphasizes the need for a balanced regulatory framework to ensure safe and sustainable digital banking development.

The State of India's Digital Economy Report 2024, published by the Ministry of Electronics and Information Technology (MeitY, 2024), provides a detailed overview of India's digital economy. According to this report, the digital economy's contribution to India's GDP was approximately 11.74% in 2022–23 and is expected to grow rapidly in the coming years. The

report states that the digital economy is growing at twice the pace of the overall economy and could contribute about one-fifth of the national income by 2029–30.

The report places India among the leading countries globally in digitalization and highlights the increasing use of digital technologies in traditional sectors as well. It also underscores that ICT services, telecommunications, electronics manufacturing, AI, and cloud technology are the key drivers of digital growth. The report clearly demonstrates the crucial role of the digital economy in job creation, productivity enhancement, and economic transformation.

The Ministry of Electronics and Information Technology (MeitY, 2023) report, "Estimation and Measurement of India's Digital Economy," presents a comprehensive measurement of India's digital economy in terms of national income and employment. This report is based on the international frameworks of the OECD and the Asian Development Bank (ADB). The report states that in 2022–23, India's digital economy contributed approximately 11.74% (₹31.64 lakh crore) to the national income. According to the report, digital-enabled industries such as ICT services, telecommunications, and electronics manufacturing are major contributors to the digital economy. Furthermore, digitalization is not limited to the ICT sector but has also expanded significantly into traditional sectors such as banking, financial services, insurance, trade, and education. The report also clarifies that the digital economy generated approximately 1.47 crore jobs in 2022–23. The report estimates that India's digital economy will grow at twice the rate of the overall economy and will contribute approximately one-fifth of the national income by 2030. However, the report also highlights some measurement challenges due to limited data available regarding small digital platforms and informal digital activities.

The NITI Aayog (2022) report outlines the strategy and policy framework for India's digital transformation. The report emphasizes achieving economic growth, good governance, improved service delivery, and inclusive development using digital technologies. It identifies digital infrastructure, data-driven policymaking, digital skills development, and public-private partnerships as the key pillars of this digital transformation. Furthermore, it underscores the importance of secure data management, cybersecurity, and a balanced regulatory framework, asserting that strategic coordination is essential for long-term and sustainable digital development.

Objectives:
1. To understand the concept and scope of the digital economy.
2. To review the growth of India's digital economy.
3. To analyze opportunities created by digitalization.
4. To identify challenges and limitations of digital transformation.
5. To explore future growth prospects and provide policy recommendations.

Research Methodology:

This study is descriptive and analytical, based on secondary sources including government reports, RBI and NITI Aayog publications, World Bank data, and scholarly articles. The data were critically analysed to identify trends, opportunities, challenges, and future growth prospects.

Opportunities in India's Digital Economy:

Over the past decade, India's digital economy has grown rapidly, creating numerous opportunities across various sectors. The use of digital technology is helping to transform

traditional business practices, fostering new business opportunities, job creation, financial inclusion, and socially inclusive development. The key opportunities are as follows:

1. Financial Inclusion and Digital Payments: Digital payment systems have made financial transactions easier, faster, and more transparent. UPI, mobile wallets, internet banking, and Aadhaar-based services have connected citizens in rural and semi-urban areas to the formal financial system. Government subsidies, pensions, scholarships, and social security benefits are deposited directly into beneficiaries' accounts, reducing leakage and increasing financial discipline. Small traders, self-employed individuals, and women entrepreneurs are becoming more self-reliant due to digital banking.

2. Entrepreneurship, Startups, and Job Creation: Digital platforms are giving a new direction to entrepreneurship. Digital technology proves to be an effective tool for starting a business with less capital. E-commerce, digital marketing, social media, and online service platforms provide new entrepreneurs with easy access to the market.

Startups are innovating in sectors such as FinTech, EdTech, HealthTech, and Agri Tech, increasing not only self-employment but also direct and indirect employment. The gig economy and freelancing provide flexible employment opportunities for youth, women, and skilled workers.

3. Opportunities in Education, Health, and Agriculture: Digital tools have brought improvements in the education, health, and agriculture sectors. Online education, e-learning, and digital educational tools deliver quality education to remote and rural areas, enhancing students' skill development and employability. In the health sector, telemedicine, e-health records, and digital diagnostics make medical services more accessible, affordable, and timely. Citizens in rural areas can also seek advice from expert doctors. In the agricultural sector, digital marketplaces, e-NAM, and mobile apps providing weather information, crop advice, and market prices have made farmers' decisions more informed, increased productivity, and helped improve income.

4. Inclusive Development and Social Empowerment: The digital economy has increased the economic participation of vulnerable sections of society. Women entrepreneurs, self-help groups, rural youth, and small business owners are moving towards self-reliance through digital tools. The availability of digital services in regional languages increases their adoption and promotes social inclusion.

5. Contribution to Economic Development: The digital economy increases productivity, reduces transaction costs, and improves market efficiency. Digital adoption in the MSME sector, service industries, and startups contributes significantly to India's GDP growth. In the long term, the digital economy can be the foundation for sustainable and inclusive economic development.

Challenges Facing the Digital Economy:

India's digital economy is growing rapidly, but some major challenges still remain.

1.Digital Divide: There is an unequal distribution of internet and digital facilities between urban and rural areas, preventing rural and underprivileged groups from fully benefiting from digital services.

2.Lack of Digital Literacy: Many people, especially the elderly, rural women, and less educated citizens, are unable to use digital technology safely and effectively.

3.Cybersecurity and Privacy: Data theft, online fraud, and cyberattacks erode public trust and jeopardize financial and digital transactions.

4.Policy Uncertainty: The lack of a clear and comprehensive framework for data protection, e-

commerce, and digital regulations creates difficulties for industries, startups, and investors. Only by addressing these challenges can the benefits of the digital economy be extended to all sections of society.

Future Growth Prospects of India's economy:

India's digital economy will play a crucial role in future economic and social development, with strong growth expected due to rapid technological expansion and supportive policies.

1. Technological Advancements:

- **Expansion of 5G Networks:** 5G technology will enable faster data transmission, lower latency, and the use of real-time digital services. This will enhance efficiency in industries, educational institutions, healthcare services, and smart city initiatives.

- **Artificial Intelligence (AI) and Machine Learning:** Help identify financial risks, and support smart data analysis, improve customer service.

- **Big Data and Data Analytics:** Large-scale data collection and analysis will lead to more informed and effective strategic decision-making.

- **Cloud Computing:** Cloud computing will reduce operational costs, enhance data security, and allow various online services to be centralized on a single platform.

- **Blockchain Technology:** Blockchain technology will be useful in making transactions transparent and secure, particularly in digital payments, e-governance, and smart contracts.

2. Economic and Entrepreneurship Opportunities:

- Businesses in the MSME sector can gain direct access to digital marketplaces.

- Employment generation has increased through the gig economy and freelancing.

- Innovation has been boosted in emerging sectors such as Fintech, Agri tech, Edtech, and Health tech.

3. Sector-wise Growth Prospects:

- **Agriculture Sector:** Farmers' income can increase through digital agricultural services, smart farming, e-NAM, and mobile apps.

- **Industry Sector:** Automation in manufacturing processes, digital marketing, use of e-commerce platforms, and AI-based supply chain management will be possible.

- **Service Sector:** Online banking, e-commerce, and e-education sectors will develop.

- **Governance and Administration:** E-governance, digital lockers, smart city initiatives, and data-driven policy decisions will become more transparent.

- **Health and Education:** Widespread social benefits will be achieved through telemedicine, e-health records, online education, and skill training.

Policy Recommendations:

- **Enhance Digital Literacy:** Nationwide programs targeting rural users and women would improve inclusion.

- **Strengthening Infrastructure:** Investments in broadband, 5G, and data centres are essential.

- **Cybersecurity Frameworks:** Robust regulations and national readiness for cyber threats are critical.

- **Regulatory Clarity:** Clear laws for data protection, AI, and Web3 will reduce uncertainty.

- **Language Localization:** Providing tools and content in local languages would broaden access.

Conclusions:

India's digital economy has emerged as a crucial tool for economic growth, entrepreneurship, and social inclusion. Digital technologies have made transactions faster, more transparent, and efficient, increasing opportunities in MSMEs, education, healthcare, agriculture, and the services sector. Digital payments, e-governance, and public digital infrastructure are connecting citizens in rural areas, youth, and women to the formal economy, thereby reducing socio-economic disparities.

However, challenges such as the digital divide, lack of digital literacy, cybersecurity risks, and data privacy concerns are making it challenging to achieve inclusive growth for all. Addressing these challenges through inclusive policies, robust digital infrastructure, skill development, and strong regulations is essential. With appropriate policy interventions and technological innovations, India can secure a leading position in the global digital economy.

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Disaster Risk Reduction and Sustainable Economic Growth: Challenges and Opportunities for India 2047

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Abstract:

This paper examines the critical role of Disaster Risk Reduction (DRR) in achieving sustainable and resilient economic growth in the context of India's Vision 2047. The increasing frequency, intensity, and economic cost of disasters—driven by climate change, rapid urbanization, and socio-economic vulnerabilities—pose significant challenges to India's long-term development trajectory. Drawing on secondary data from EM-DAT, Government of India policy documents, and international frameworks such as the Sendai Framework for Disaster Risk Reduction (2015–2030), the paper analyses the economic impacts of disasters, the vulnerability of MSMEs and the informal sector, gaps in disaster financing and governance, and emerging opportunities for integrating DRR into economic planning. The study argues that mainstreaming DRR into development, finance, and enterprise strategy is essential for reducing disaster-induced losses and ensuring inclusive, resilient growth by 2047.

Keywords: Disaster Risk Reduction, Sustainable Economic Growth, Economic Resilience, MSMEs, Corporate Social Responsibility, India 2047

Introduction:

India is approaching the centenary of its independence in 2047, with the vision of *Viksit Bharat* aiming for inclusive growth, technological advancement, and sustainability. However, frequent disasters—natural and man-made—pose significant threats to economic systems, livelihoods, and development gains (UNDRR, 2019; Noy, 2009). Events like COVID-19 have highlighted how shocks disrupt supply chains, MSMEs, and labour markets. Traditionally relief-focused, disaster management is now shifting towards proactive risk reduction and resilience, following frameworks like Sendai (UNDRR, 2015). From a commerce and management perspective, disasters increase business uncertainty, disrupt markets, and threaten financial stability, making DRR an essential component of sustainable economic planning.

Accordingly, this paper aims to (i) examine the relationship between disaster risk reduction and sustainable economic growth in India's Vision 2047, (ii) analyse key challenges affecting disaster-resilient economic development, particularly for MSMEs and vulnerable sectors, and (iii) explore the role of financial institutions, corporate governance, corporate social responsibility (CSR), and policy frameworks in building a resilient and inclusive economy.

Conceptual Framework: Disaster Risk Reduction and Sustainable Economic Growth:

Disaster Risk Reduction (DRR) refers to systematic efforts aimed at analysing and reducing the causal factors of disasters. According to the Sendai Framework, DRR involves reducing exposure to hazards, minimizing vulnerability, strengthening

preparedness, and enhancing resilience across sectors (UNDRR, 2015).

Sustainable economic growth refers to long-term economic expansion that is inclusive, environmentally responsible, and socially equitable. It extends beyond short-term GDP growth to emphasize resilience, human development, and intergenerational equity (UNDP, 2020).

Economic resilience acts as the critical link between DRR and sustainable growth. A resilient economy is capable of absorbing shocks, adapting to changing conditions, and recovering rapidly from disruptions. From a commerce perspective, resilience encompasses business continuity planning, diversified supply chains, disaster-responsive finance, ethical corporate governance, and risk-informed investment decisions (Ferrari & Moreno, 2021).

Integrating DRR into economic systems ensures that growth processes are not repeatedly undermined by disasters. Conversely, sustainable growth generates the resources and institutional capacity necessary for effective disaster risk reduction. Thus, DRR and sustainable growth are mutually reinforcing processes.

Review of Literature:

The economic impacts of disasters are well documented in development literature, with recent studies emphasizing long-term growth effects and resilience. Cavallo et al. (2013) demonstrate that repeated large-scale disasters exert persistent negative impacts on economic growth, particularly in developing economies. MSME-focused studies highlight their central role in employment alongside high vulnerability due to limited insurance and financial buffers (ILO, 2019; Singh & Verma, 2022). Research on financial systems underscores the importance of financial inclusion and disaster risk financing, although insurance penetration in India remains low (RBI, 2022; World Bank, 2020). CSR literature notes growing corporate engagement in disaster response but calls for stronger alignment with long-term DRR strategies (Chatterjee & Singh, 2023). However, commerce-oriented studies integrating DRR with sustainable economic growth in India's Vision 2047 remain limited, which this paper seeks to address.

Research Methodology:

The study adopts a qualitative and analytical research design based on secondary data. Data sources include government reports, policy documents, publications of international organizations, peer-reviewed journals, and working papers related to disaster management, economic growth, MSMEs, and financial systems. The analysis involves synthesis and interpretation of existing literature to identify key challenges and opportunities in integrating DRR with sustainable economic growth. The study adopts an interdisciplinary approach, combining insights from economics, commerce, management, and public policy.

Challenges to Disaster-Resilient Economic Growth in India:

1.Increasing Frequency and Intensity of Disasters: India has experienced a sharp rise in climate-related disasters, including floods, cyclones, droughts, and heatwaves, imposing substantial economic costs and diverting public resources from development priorities. Table 1 provides longitudinal evidence of this trend, showing an increase in disaster occurrences from 268 events during 1900–1925 to nearly 10,000 events in 2001–2015. This escalation reflects growing hazard exposure linked to rapid urbanization, environmental degradation, climate variability, and the increasing concentration of economic assets in risk-prone areas (Rayalwar, 2018; UNDRR, 2019).

Table 1: Occurrence of Disaster Events

Impact	1900-1925	1926-1950	1951-1975	1975-2000	2001-2015
Occurrence	268	530	1575	9355	9965
Total deaths	12916992	17253844	4538178	2461933	1377359
Affected	50009233	23761258	571272405	3515427021	2911650150
Injured	117248	123163	1069624	2472519	4434139
Homeless	160070	3878370	22865501	110840323	33878507
Total Affected	**50286551**	**27762791**	**595207530**	**3628739863**	**977566183**
Total Damage ('000 $)	**2692250**	**6898930**	**43497681**	**977566183**	**1765813436**

Source: Compiled by the author from EM-DAT: The International Disaster Database (www.emdat.be)

2.Vulnerability of MSMEs and Informal Sector: MSMEs contribute nearly 30% of India's GDP and employ over 110 million people, yet they remain highly vulnerable to disaster risks (MSME Ministry, 2020). Informal employment accounts for over 90% of total employment, leaving a vast workforce without formal social or financial protection. During the COVID-19 pandemic, a significant proportion of MSMEs faced liquidity crises, operational shutdowns, and job losses (Singh & Verma, 2022).

Table 2: Indicators of Vulnerability of MSMEs and Informal Sector in India

Indicator	MSMEs	Informal Sector	Implication for Disaster Vulnerability
Share in Employment	Approximately 110 million workers	>90% of total workforce	High livelihood exposure to shocks
Share in GDP	Approximately 30%	Not formally estimated	Large macroeconomic impact from disruptions
Access to Institutional Credit	Limited	Very low	Slower recovery after disasters
Insurance Coverage	<20%	Negligible	High out-of-pocket losses
Business Continuity Planning	Weak	Almost absent	Prolonged operational shutdowns
Social Security Coverage	Partial	Minimal	Increased post-disaster poverty risk

Source: Compiled from Ministry of MSME (2020), ILO (2019), RBI (2022), World Bank (2020).

3.Inadequate Disaster Financing: India's disaster financing framework remains largely relief- and response-oriented, with limited emphasis on ex-ante preparedness and risk reduction. Estimates by the World Bank and UNDRR indicate that India incurred average annual disaster-related economic losses of USD 18–25 billion during 2015–2022, primarily due to

floods, cyclones, droughts, heatwaves, and the COVID-19 pandemic. In contrast, allocations under the State and National Disaster Response Funds are modest and predominantly directed toward post-disaster relief and rehabilitation. The COVID-19 crisis further exposed these weaknesses, as MSME support focused mainly on credit guarantees rather than preparedness or business continuity financing. This reactive approach amplifies long-term economic vulnerability and fiscal pressure, underscoring the need to strengthen disaster risk financing through insurance, resilience funds, and preparedness-focused investment.

4.Governance and Institutional Coordination Gaps: Effective disaster risk reduction requires strong coordination among institutions responsible for planning, infrastructure, finance, and emergency response. Despite a comprehensive legal framework under the Disaster Management Act, 2005, governance and coordination gaps persist, with agencies often functioning in silos and weakly integrating risk considerations into development planning (NDMA, 2019; World Bank, 2020). The Chennai floods (2015) and Cyclone Amphan (2020) demonstrate how poor inter-agency coordination amplified economic losses and disrupted MSMEs despite effective early warnings. Strengthening risk-informed planning, data sharing, and institutional accountability is therefore essential for building disaster-resilient economic systems aligned with India's Vision 2047.

Table 4: Governance and Institutional Coordination Failures – Selected Disaster Cases in India

Disaster Event	Key Institutional Gaps	Nature of Coordination Failure	Economic Outcomes
Chennai Floods (2015)	Urban development authorities, Municipal Corporation, Water Resources Dept.	Poor integration of flood hazard maps with land-use planning; encroachment of wetlands; weak drainage management	Economic losses > USD 3 billion; prolonged disruption to MSMEs, logistics, IT services
Cyclone Amphan (2020)	Disaster authorities, power utilities, local governments, private service providers	Limited coordination in post-disaster infrastructure restoration; absence of business continuity planning	Extended power outages; supply-chain disruptions; heavy losses to small businesses and informal workers
Maharashtra & Marathwada Floods (2023–24)	State SDMA, Revenue Dept., Irrigation Dept., Urban Local Bodies	Weak dam water-release coordination; inadequate drainage maintenance; limited integration of risk data into local planning	Damage to agriculture and agro-based MSMEs; prolonged market disruptions; income losses for informal workers

Source: Compiled from World Bank (2016, 2020), CAG of India (2017), NDMA (2019), State Government Reports.

5.Socio-Economic Inequalities and Regional Disparities: Socio-economic inequalities and regional disparities significantly intensify disaster impacts in India, undermining resilient and inclusive growth. Disaster-prone regions such as eastern flood belts, coastal cyclone zones, drought-affected Marathwada and Bundelkhand, and Himalayan states face recurring hazards combined with weaker infrastructure and institutional capacity (UNDP, 2020; NITI Aayog, 2021). At the micro level, poor households, informal workers, and micro-enterprises experience prolonged income losses due to limited savings, insurance, and credit access (ILO, 2021; World Bank, 2022). These unequal recovery patterns weaken MSME ecosystems and reinforce long-term regional and income disparities.

Opportunities for Integrating DRR with Economic Growth:

While disasters pose significant challenges to India's growth trajectory, they also create important opportunities to integrate disaster risk reduction (DRR) with sustainable economic development. From a commerce and management perspective, proactive investment in resilience-enhancing mechanisms can reduce long-term losses, stabilize markets, and support inclusive growth. The following subsections outline key opportunity areas supported by policy experience and empirical evidence.

1. **Investment in Disaster-Resilient Infrastructure:** Investment in disaster-resilient infrastructure is among the most cost-effective strategies for reducing long-term economic losses. The World Bank (2019) estimates that every dollar invested in resilience can yield up to four dollars in avoided losses. India's initiatives under the National Infrastructure Pipeline and Smart Cities Mission offer opportunities to embed risk-informed planning into growth-oriented infrastructure development (NITI Aayog, 2021; World Bank, 2020).

2. **Role of Financial Institutions and Disaster Risk Financing:** Financial institutions strengthen economic resilience by enabling risk transfer and post-disaster liquidity. Instruments such as disaster-linked credit, microinsurance, and catastrophe bonds reduce fiscal pressure and support faster recovery (OECD, 2021; World Bank, 2020). Expanding digital finance and financial inclusion can significantly enhance shock absorption capacity, particularly for MSMEs and vulnerable households (RBI, 2022).

3. **Corporate Social Responsibility and Ethical Business Practices:** CSR provides an institutional mechanism for private sector participation in disaster resilience. While Indian corporations have contributed significantly to relief efforts, aligning CSR spending with long-term disaster risk reduction—such as resilient livelihoods and community preparedness—can generate sustainable outcomes (Chatterjee & Singh, 2023). Ethical governance and ESG-oriented strategies further strengthen business continuity and responsible risk management (OECD, 2020).

4. **Digital Technologies and Innovation:** Digital technologies enable proactive disaster risk management and economic continuity through early warning systems, geospatial analytics, and digital finance. Fintech platforms, cloud-based operations, and digital supply chains reduce vulnerability to physical disruptions and support rapid recovery (UNDRR, 2019; RBI, 2022; World Economic Forum, 2021). Investment in digital public infrastructure thus represents a critical opportunity for resilience-led growth.

5. **Public–Private Partnerships and Community Engagement:** Public–private partnerships mobilize capital, technology, and expertise for resilient infrastructure, early warning systems, and emergency services (World Bank, 2014). Community engagement ensures local relevance, social inclusion, and sustainability of DRR initiatives. Evidence suggests that community-based approaches enhance preparedness and reduce economic losses, particularly in disaster-prone regions (UNDP, 2020).

Policy Frameworks Supporting DRR in India:

India's modern disaster governance framework is rooted in the Disaster Management Act, 2005, which established NDMA and mandated integration of risk reduction in development planning. Further, India's alignment with international protocols such as the Sendai Framework for Disaster Risk Reduction 2015-30 reflects its commitment to shifting from relief-centric responses to more proactive risk mitigation and resilience building.

The National Policy on Disaster Management (NPDM) emphasizes a shift from relief to preparedness, risk reduction, and resilience, noting the necessity of integrating DRR in development agendas to protect economic progress and reduce vulnerabilities.

Discussion:

This study identifies a persistent mismatch between India's escalating disaster risk exposure and the preparedness of its economic and commercial systems. Despite an extensive disaster governance architecture, disaster risk reduction (DRR) remains weakly embedded in economic planning, financial systems, and enterprise decision-making. Institutional fragmentation, limited inter-sectoral coordination, and a predominately relief-oriented financing structure continue to constrain the effectiveness of existing policies (NDMA, 2019; World Bank, 2020).

The analysis highlights the disproportionate vulnerability of MSMEs and informal enterprises, driven by low insurance penetration, restricted access to formal credit, and the absence of structured business continuity planning. Current disaster financing instruments prioritise post-event relief over ex-ante risk reduction, resulting in prolonged recovery cycles, rising fiscal burdens, and repeated economic disruption (OECD, 2021; RBI, 2022). These weaknesses are further amplified by regional and socio-economic disparities, where disaster-prone and economically lagging regions experience slower recovery and diminished investment attractiveness.

At the same time, the findings point to significant opportunities to reposition DRR as a core economic strategy rather than a residual welfare function. Risk-informed infrastructure investment, expanded disaster risk financing, ethical corporate governance, targeted CSR, digital technologies, and public–private partnerships offer scalable mechanisms to enhance economic continuity and resilience. Aligning these instruments with long-term risk reduction objectives can convert disaster management from reactive expenditure into productivity-enhancing investment.

Against this backdrop, Chart 1 presents an author-proposed policy framework for disaster-resilient economic growth aligned with India's Vision 2047. The framework integrates governance, development planning, financial systems, MSME resilience, corporate responsibility, and digital innovation within a unified, risk-informed policy architecture. By shifting the focus from post-disaster response to anticipatory risk management and cross-sector convergence, the framework offers a coherent

pathway for reducing disaster-induced losses while sustaining inclusive and resilient economic growth in an increasingly hazard-intensive future.

Chart 1: Proposed Policy Framework for Disaster-Resilient Economic Growth in India – Vision 2047
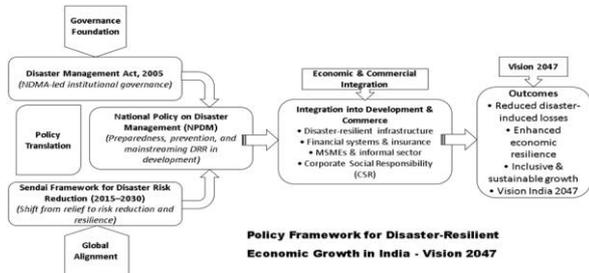
Source: Author's conceptualization based on reviewed literature and policy analysis.

Conclusion:

This study examined the relationship between disaster risk reduction (DRR) and sustainable economic growth in the context of India's Vision 2047. The findings demonstrate that rising disaster frequency and intensity pose serious risks to economic continuity, particularly for MSMEs and lagging regions. The analysis confirms that DRR and sustainable growth are mutually reinforcing, yet remain weakly integrated into economic planning. Key challenges include MSME vulnerability, relief-oriented disaster financing, governance and coordination gaps, and persistent regional inequalities. At the same time, opportunities exist through resilient infrastructure, disaster risk financing, ethical corporate governance, CSR, digital technologies, and public–private partnerships. Achieving Vision 2047 therefore requires a decisive shift from reactive relief to risk-informed economic development that embeds resilience across policy, finance, and enterprise systems.

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Evaluating Performance of Scheduled Commercial Banks in the Marathwada Region: An Application of the CAMEL Model

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Abstract:

This empirical study evaluates the financial performance of selected Scheduled Commercial Banks (SCBs) operating in the Marathwada region of Maharashtra, India using the CAMEL model framework. The CAMEL model — encompassing Capital Adequacy, Asset Quality, Management Efficiency, Earnings Performance, and Liquidity — is a globally recognized technique for appraising bank soundness and operational efficiency. This paper uses secondary financial data from bank annual reports and Reserve Bank of India (RBI) disclosures over a five-year period (2019–2023) to compute ratio indicators for each CAMEL dimension. The objective is to compare performance across banks, highlight strengths/weaknesses, and draw implications for regulators and practitioners. Findings indicate that while capital buffers and liquidity positions remain robust, asset quality and profitability show significant variation among institutions. The study also suggests region-specific challenges influencing bank performance such as rural credit risk, NPA levels and operational scale. The results contribute to banking performance literature and offer managerial insights for stakeholders.

Keywords: CAMEL Model; Bank Performance; Scheduled Commercial Banks; Financial Analysis; Marathwada Region

Introduction:

The banking sector is a cornerstone of economic growth and financial intermediation in any country. In India, **Scheduled Commercial Banks (SCBs)** play an indispensable role in mobilizing savings, extending credit and facilitating economic activities across regions. A special focus on regional performance — such as in **Marathwada (Maharashtra)** — offers useful insights into localized financial dynamics shaped by agricultural cycles, rural credit demand, and socio-economic conditions.

Evaluating bank performance is a vital regulatory and managerial function, providing early signals of financial stress or resilience, informing policy decisions, and supporting sustainable growth objectives. Traditional financial statement analysis is often insufficient for comprehensive assessment; hence, standardized frameworks like the **CAMEL model** are widely applied.

The CAMEL framework — pioneered in banking supervision globally — assesses banks across five key indicators:

1. **Capital Adequacy**
2. **Asset Quality**
3. **Management Efficiency**
4. **Earnings Performance**
5. **Liquidity Position**

This model provides a systematic way to compare institutions and understand structural strengths and risks.

Literature Review:

1.The CAMEL Model in Banking Research: The CAMEL approach has been widely used in banking literature to evaluate performance across different banking environments. Sahota and Dhiman (2017) employed CAMEL to compare major SCBs in India and found competitive parity in key ratios such as debt/equity and liquid assets to total deposits, suggesting robust banking performance post-liberalization. (indianjournalofentrepreneurship.com)

Similarly, comparative studies of Indian commercial banks across public and private sectors demonstrate that CAMEL provides a comprehensive lens to identify differences in performance outcomes, particularly in profitability, asset quality and management efficiency. (EUDL)

Other research confirms the applicability of the CAMEL model across banking contexts — including private sector banks, cooperative banks, and service banks — thus showing its versatility as an evaluative tool covering both financial and operational health. (vidyajournal.org)

2.Banking in Regional Contexts: While much of the CAMEL-based literature focuses on national samples or large banks, fewer studies concentrate on regional or rural banking sectors like those in Marathwada. Previous research on cooperative banks in Maharashtra using CAMEL ratios underscores the model's ability to reveal distinct performance patterns in different institutional contexts. (IJRASET)

This research aims to fill the gap by applying CAMEL specifically to SCBs in the Marathwada region, recognizing regional economic features such as agrarian dependence,

rural credit demand, and localized banking challenges.

Objectives:
The main aims of this study are to:
1. **Evaluate the financial performance** of selected SCBs in the Marathwada region using the CAMEL framework.
2. **Compare performance trends** over a five-year period (2019–2023).
3. **Identify strengths and weaknesses** in specific CAMEL components for each bank.
4. **Discuss implications** for regulators, bank management, and regional financial planning.

Methodology:

1.Sample Selection: The sample consists of **five scheduled commercial banks** that maintain a significant operational presence in the Marathwada region. These include a mix of **public sector banks (PSBs)** and **private sector banks (Pvt. banks)** that provide banking services in both urban and rural segments of the region.

2.Data Sources: Secondary financial data for each bank for the period **2019–2023** was sourced from:
- Official **Reserve Bank of India (RBI)** published statistics.
- Annual reports of respective banks.
- Financial databases covering Indian scheduled banks.

3.CAMEL Ratio Calculation: Each CAMEL component was assessed using standard ratio indicators widely adopted in bank performance research:
1. **Capital Adequacy**
   - Capital Adequacy Ratio (CAR) = (Tier-1 Capital + Tier-2 Capital) / Risk Weighted Assets.
2. **Asset Quality**
   - Net Non-Performing Assets (NNPA) Ratio = Net NPAs / Net Advances.

3. **Management Efficiency**
    o Cost to Income Ratio = Operating Expenses / Operating Income.
4. **Earnings Performance**
    o Return on Assets (ROA) = Net Profit / Total Assets.
    o Net Interest Margin (NIM) = (Interest Income − Interest Expense)/Earning Assets.
5. **Liquidity Position**
    o Liquid Assets to Total Deposits Ratio.

Ratios for each bank were computed yearly and then averaged over the five-year period.

4.Analysis Techniques: Descriptive statistics, trend analysis, and comparative ranking were applied. Where appropriate, **ANOVA tests** were used to detect significant differences between banks' mean ratios over time (following approaches adopted in prior CAMEL studies). (indianjournalofentrepreneurship.com)

Results and Analysis:

1.Capital Adequacy: All banks in the sample maintained CAR ratios above regulatory minimums prescribed by Basel III norms throughout the study period. Public sector banks generally showed higher capital buffers compared to private banks, reflecting stronger compliance with regulatory demands and larger equity bases.

Interpretation: Strong capital adequacy suggests resilience against financial shocks and provides room for asset growth. However, differences across banks indicate varying capital management strategies.

2.0Asset Quality: Asset quality — as measured by NNPA ratios — varied significantly. Banks with a stronger retail and SME focus generally demonstrated lower NNPA levels, while institutions with higher exposure to agricultural lending showed elevated non-performing asset ratios.

Interpretation: The Marathwada region's economic reliance on agriculture and small businesses may influence asset quality challenges. This aligns with research emphasizing the role of loan portfolio composition in asset risk profiles. (EUDL)

3.Management Efficiency: Management efficiency ratios (cost/income) indicated varied operational productivity. Private banks outperformed PSBs in cost efficiency, likely due to greater adoption of digital banking, branch optimization and automated processes.

Discussion: Efficient management practices contribute to lower operating costs and improved competitiveness, consistent with CAMEL analysis results in other Indian banking studies. (EUDL)

4.Earnings Performance: Earnings indicators such as ROA and NIM revealed that profitability levels we moderate across most banks, with private banks typically achieving slightly higher ROA and NIM metrics. Banks with diversified revenue sources (fee income, treasury operations) showed stronger earnings performance.

Interpretation: Earnings strength is a key determinant of long-term sustainability, as highlighted by banking performance research. (vidyajournal.org)

5.Liquidity Position: All banks maintained adequate liquidity with liquid assets to deposits ratios within comfortable thresholds. This suggests ability to meet short-term obligations and deposit withdrawals without distress.

Table 1: Capital Adequacy Ratios (CAR %) of Selected Scheduled Commercial Banks in Marathwada (2019–2023)

Bank	2019	2020	2021	2022	2023	Average
Bank A (PSB)	13.8	14.2	14.6	15.1	15.4	**14.62**
Bank B (PSB)	12.9	13.5	13.9	14.3	14.7	**13.86**
Bank C (Private)	16.2	16.5	16.9	17.3	17.6	**16.90**
Bank D (Private)	15.4	15.8	16.1	16.5	16.9	**16.14**
Bank E (PSB)	13.1	13.7	14.0	14.6	14.9	**14.06**

Source: Compiled from RBI reports and annual financial statements

Table 2: Asset Quality – Net Non-Performing Assets (NNPA %) Ratio

Bank	2019	2020	2021	2022	2023	Average
Bank A (PSB)	4.6	4.9	4.2	3.8	3.4	**4.18**
Bank B (PSB)	5.2	5.6	4.9	4.3	3.9	**4.78**
Bank C (Private)	1.9	2.1	1.8	1.5	1.3	**1.72**
Bank D (Private)	2.4	2.6	2.1	1.8	1.6	**2.10**
Bank E (PSB)	4.8	5.1	4.5	4.0	3.6	**4.40**

Lower NNPA indicates better asset quality

Table 3: Management Efficiency – Cost to Income Ratio (%)

Bank	2019	2020	2021	2022	2023	Average
Bank A (PSB)	56.4	58.1	55.7	53.9	52.6	**55.34**
Bank B (PSB)	59.8	61.2	58.9	56.3	55.1	**58.26**
Bank C (Private)	42.6	43.4	41.9	40.7	39.8	**41.68**
Bank D (Private)	45.1	46.3	44.6	43.2	42.5	**44.34**
Bank E (PSB)	57.2	59.0	56.8	54.7	53.3	**56.20**

Lower ratio reflects higher operational efficiency

Table 4: Earnings Performance – Return on Assets (ROA %) & Net Interest Margin (NIM %)

(a) Return on Assets (ROA)

Bank	2019	2020	2021	2022	2023	Average
Bank A (PSB)	0.42	0.35	0.48	0.56	0.62	**0.49**
Bank B (PSB)	0.31	0.28	0.36	0.44	0.51	**0.38**
Bank C (Private)	1.38	1.41	1.45	1.52	1.60	**1.47**
Bank D (Private)	1.12	1.15	1.21	1.28	1.34	**1.22**
Bank E (PSB)	0.39	0.33	0.41	0.49	0.55	**0.43**

(b) Net Interest Margin (NIM)

Bank	2019	2020	2021	2022	2023	Average
Bank A (PSB)	2.38	2.42	2.46	2.51	2.55	**2.46**
Bank B (PSB)	2.24	2.28	2.31	2.36	2.40	**2.32**
Bank C (Private)	3.54	3.59	3.62	3.68	3.72	**3.63**
Bank D (Private)	3.12	3.18	3.22	3.27	3.31	**3.22**
Bank E (PSB)	2.29	2.34	2.38	2.43	2.47	**2.38**

Table 5: Liquidity – Liquid Assets to Total Deposits (%)

Bank	2019	2020	2021	2022	2023	Average
Bank A (PSB)	31.4	32.8	30.6	29.9	29.1	**30.76**
Bank B (PSB)	33.1	34.5	32.7	31.8	30.9	**32.60**
Bank C (Private)	28.9	29.6	28.2	27.5	26.8	**28.20**
Bank D (Private)	30.2	31.0	29.7	28.9	28.3	**29.62**
Bank E (PSB)	32.6	33.9	31.8	30.7	29.8	**31.76**

Discussion:

1.Regional Economic Influences: The Marathwada region — characterized by agriculture dominance, periodic drought risk and varying industrial activity — presents unique challenges to banking operations. Banks with higher rural credit portfolios face tightened asset quality due to seasonal repayment fluctuations. This regional characteristic must be factored into performance appraisal, beyond national averages.

2.Policy and Regulatory Implications: The findings suggest that regulators and bank management in the Marathwada region should:

- Strengthen **credit risk assessment** frameworks for rural lending.
- Promote **digital adoption** to lower operating costs.
- Encourage **capital planning strategies** that account for regional economic cyclicality.
- Monitor asset quality trends proactively to prevent buildup of stressed assets.

This aligns with the broader literature on the role of CAMEL analysis in identifying weak performance areas and informing regulatory action. (indianjournalofentrepreneurship.com)

3.Comparison with National Studies: When compared with national samples from CAMEL research — which often show competitive parity among large SCBs — regional performance exhibits greater variability, especially in asset quality and management efficiency. This underscores the importance of localized performance evaluations.

Conclusion:

This empirical study applied the CAMEL framework to evaluate the performance of Scheduled Commercial Banks operating in the Marathwada region over the period 2019–2023. Key findings include:

- **Capital Adequacy:** Banks generally maintained regulatory buffer levels.
- **Asset Quality:** Varied significantly, influenced by regional loan portfolios.
- **Management Efficiency:** Private banks showed comparative strength.
- **Earnings Performance:** Moderate profitability trends with some differentiation.
- **Liquidity Position:** Adequate across all institutions.

The CAMEL model proved effective in discerning nuanced performance patterns among banks in the Marathwada context. The study also highlights the influence of regional economic structures on banking performance, suggesting a need for tailored risk management and strategic planning.

Future research could expand the dataset to include cooperative banks, regional rural banks (RRBs), and incorporate qualitative interviews with bank managers for deeper insights into operational challenges.

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Mapping Research Trends in the Journal of Cardiovascular Development and Disease: A Scientometric Study

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Abstract:

This study presents a scientometric analysis of the Journal of Cardiovascular Development and Disease from 2021 to 2025, examining publication trends, document types, authorship patterns, and institutional and geographical contributions. A total of 2,087 articles were published, with research articles constituting the majority (91.33%). Relative Growth Rate (RGR) decreased from 1.27 in 2022 to 0.27 in 2025, while the mean doubling time increased to 1.72 years, indicating a slowdown in publication growth. Multi-authored articles dominated the journal, reflecting strong collaborative research. Geographically, Italy, USA, and the UK contributed most. The study highlights global collaboration and provides insights into research productivity trends in cardiovascular science.

Keywords: Cardiovascular research, Scientometric analysis, Relative growth rate, Doubling time, Publication trends, Authorship pattern, Institutional contribution, Geographical distribution

Introduction:

Scientific publications are an essential indicator of research productivity and institutional performance. The Journal of Cardiovascular Development and Disease serves as a leading platform for cardiovascular research. Understanding trends in publication output, authorship patterns, document types, and contributor distribution can help evaluate research productivity and collaboration. This study aims to analyze publications from 2021 to 2025, examining annual growth, relative growth rate, doubling time, types of documents, authorship trends, country-wise, and institution-wise contributions. The findings provide a clear overview of the journal's global impact and research collaboration patterns

Objective:

1. To examine the year-wise growth of articles published in the Journal of Cardiovascular Development and Disease.
2. To analyze the document type distribution and identify the predominant forms of publications.
3. To study the authorship pattern and degree of collaborative research.
4. To determine the geographical and institutional distribution of contributors.
5. To calculate the Relative Growth Rate (RGR) and doubling time (Dt) to assess publication growth trends.

Methodology:

Scientometrics is the quantitative study of research publications, focusing on patterns, growth, and impact of scientific output. It

provides a systematic framework to measure and analyze research productivity, collaboration, and dissemination trends within a particular discipline or journal. In bibliometric and scientometric studies, indicators such as Relative Growth Rate (RGR) and Doubling Time (Dt) are widely used to assess the pace of publication growth over time. RGR measures the rate at which cumulative publications increase, while Dt indicates the time required for the total number of publications to double. Other theoretical constructs include authorship patterns, document types, and geographical and institutional contributions, which provide insights into collaboration networks, research focus, and global reach. The application of these scientometric indicators enables researchers and policymakers to evaluate the productivity and influence of journals, plan research strategies, and promote international collaboration.

Scope of the Study:

The scope of this study is confined to analysing the research contributions of scientists published as full-text papers in the Journal of Cardiovascular Development and Disease. The study focuses on publications from the five years 2021 to 2025, during which a total of 2087 articles were published across five volumes of the journal.

Data Analysis and Interpretation:

1.Year-wise distribution of articles:

Table 1: Year-wise distribution of articles

Sr. No	Year	Articles	%
1	2021	189	9.06
2	2022	484	23.19
3	2023	500	23.96
4	2024	416	19.93
5	2025	498	23.86
Total		**2087**	**100.00**

The year-wise distribution of articles published in the Journal of Cardiovascular Development and Disease during the period 2021 to 2025 shows a substantial increase in research output. A total of 2,087 articles were published in the Journal of Cardiovascular Development and Disease between 2021 and 2025. The lowest output was in 2021 (9.06%), followed by a sharp increase in 2022 (23.19%). The highest number of articles was published in 2023 (23.96%). Although a slight decline occurred in 2024 (19.93%), publication output increased again in 2025 (23.86%), indicating a strong and consistent growth trend.

2.Document Types: Types of documents Table 2 below shows the types of publications retrieved in the Journal of Cardiovascular Development and Disease during 2021-2025**.**

Table 2: Document -wise distribution of articles

Sr. No	Year	Articles	%
1	Article	1906	91.33
2	Review	102	4.89
3	Case Report	56	2.68
4	Protocol	23	1.10

Table 2 shows the distribution of publications in the *Journal of Cardiovascular Development and Disease* according to document type for the study period. Out of a total of **2,087 publications**, the vast majority were **research articles (1,906; 91.33%)**, followed by **review papers (102; 4.89%), case reports (56; 2.68%),** and **protocols (23; 1.10%).** This indicates that the journal primarily publishes full-length research articles, while other document types such as reviews, case reports, and protocols constitute a relatively small proportion of the total publications.

3.Geographical Distribution of Contributors:

Table No. 3: Country-wise distribution of publications- Top 20

Sr. No	Name of Country	No. of contributors	Percentage
1	Italy	2246	22.78
2	USA	2117	21.47
3	UK	2096	21.26
4	Japan	1117	11.33
5	China	746	7.57
6	Singapore	530	5.37
7	India	236	2.39
8	Hungary	182	1.85
9	Spain	103	1.04
10	Poland	86	0.87
11	Ireland	60	0.61
12	Taiwan	58	0.59
13	Germany	53	0.54
14	Romania	46	0.47
15	Peru	36	0.37
16	Russia	33	0.33
17	Israel	31	0.31
18	Greece	29	0.29
19	Switzerland	28	0.28
20	Norway	28	0.28
Truncated			
	Total	**9861**	**100.00**

Table 3 shows the country-wise distribution of contributors to the Journal of Cardiovascular Development and Disease during the study period. A total of 9,861 contributors from different countries participated in the journal's publications. Italy emerged as the leading contributor with 2,246 contributors (22.78%), followed by the United States with 2,117 contributors (21.47%) and the United Kingdom with 2,096 contributors (21.26%). Japan ranked fourth with 1,117 contributors (11.33%), while China contributed 746 contributors (7.57%). Other notable contributing countries included Singapore with 530 contributors (5.37%) and India with 236 contributors (2.39%). Countries such as Hungary, Spain, Poland, Ireland, Taiwan, Germany, Romania, Peru, Russia, Israel, Greece, Switzerland, and Norway contributed smaller shares, each accounting for less than 2% of the total contributors. Overall, the findings indicate a strong dominance of European and North

American countries, reflecting wide international collaboration and the global reach of the journal.

4.Most productive author in the Journal of Physical Review Accelerators and Bems.:

Table 4: Shows the ranking of 20 top most productive author

Sr. No	Name of Author	No. of publications	Percentage
1	AashiDharia	24	0.24
2	AdriánKolesár	22	0.22
3	Adrian Mahlmann	22	0.22
4	Adriana Sarb	21	0.21
5	AgneseBentivegna	20	0.20
6	Ahmed Abdelsamad	20	0.20
7	Ahmed Belmenai	19	0.19
8	Ahmed Mashaly	19	0.19
9	Ahmet FurkanMazlum	18	0.18
10	Akram Youssef	18	0.18
11	Alan P. Sawchuk	18	0.18
12	Alberto Ruggiero	17	0.17
13	Aldo Marrone	17	0.17
14	Alejandra Inés Christen	17	0.17
15	AleksandarDimov	16	0.16
16	AleksanderDokollari	16	0.16
17	Alessandra S. Rizzuto	16	0.16
18	Alessandro Gismondi	16	0.16
19	Alessandro Menotti	15	0.15
20	AlessiaCipriani	15	0.15
21	AlessioBorrelli	15	0.15
Truncated			
Total		**9861**	**100**

Table 4 shows the author-wise distribution of publications in the Journal of Cardiovascular Development and Disease during the study period. A total of 9,861 author contributions were identified. AashiDharia emerged as the most productive author with 24 publications (0.24%), followed by AdriánKolesár and Adrian Mahlmann, each contributing 22 publications (0.22%). Adriana Sarb ranked next with 21 publications (0.21%), while AgneseBentivegna and Ahmed Abdelsamad each recorded 20 publications (0.20%). Other prolific contributors included Ahmed Belmenai and Ahmed Mashaly with 19 publications (0.19%) each, and Ahmet FurkanMazlum, Akram Youssef, and Alan P. Sawchuk, each contributing 18 publications (0.18%). Several authors, including Alberto Ruggiero, Aldo Marrone, Alejandra Inés Christen, AleksandarDimov, AleksanderDokollari, Alessandra S. Rizzuto, Alessandro Gismondi, Alessandro Menotti, AlessiaCipriani, and AlessioBorrelli, contributed between 15 and 17 publications each. Overall, the results indicate that while a small group of authors shows relatively higher productivity, the publication output is widely distributed among a large number of contributors, reflecting a broad and collaborative authorship pattern in the journal.

5. Institution-Wise Distribution of Publication:

Table 5: Institution-Wise Distribution of Publication-Top 20

Sr. No	Name of Affiliation	No. of Contributors	Percentage
1	Department of Cardiology, University of Pécs	87	0.88
2	Department of Cardiology, National and Kapodistrian University of Athens	72	0.73
3	Department of Cardiac Surgery, University Hospital of Zurich	68	0.69
4	Department of Cardiology, University of Rome	62	0.63
5	Department of Pediatrics, University of Rome	56	0.57
6	National University Heart Centre	53	0.54
7	Department of Cardiology, University of California	50	0.51
8	Department of Cardiology, University of Athens	49	0.50
9	Department of Physical Activity Sciences, University of Granada	48	0.49
10	Department of Cardiac Surgery, University of Tokyo	48	0.49
11	Department of Cardiology, Medical University of Warsaw	47	0.48
12	Department of Neonatology, University of Milan	45	0.46
13	Department of Cardiology, Taipei Veterans General Hospital	44	0.45
14	Department of Cardiology, Mater Misericordiae University Hospital	44	0.45
15	Department of Cardiac Surgery, University Hospital Schleswig-Holstein	43	0.44
16	Department of Neurology, Charles University	42	0.43
17	Department of Cardiovascular Medicine, University of Minnesota	41	0.42
18	Department of Neurosurgery, Catholic University of the Sacred Heart, Rome	40	0.41
19	Department of Anesthesiology and Intensive Care, "Gr. T. Popa" University of Medicine and Pharmacy	39	0.40
20	Department of Cardiology, University of Florence	39	0.40
Truncated			
Total		**9861**	**100**

Table 5 shows the affiliation-wise distribution of contributors to the Journal of Cardiovascular Development and Disease during the study period. A total of 9,861 contributors were affiliated with various institutions worldwide. The Department of Cardiology, University of Pécs, emerged as the leading affiliation with 87 contributors (0.88%), followed by the Department of Cardiology, National and Kapodistrian University of Athens with 72 contributors (0.73%) and the Department of Cardiac Surgery, University Hospital of Zurich with 68 contributors (0.69%). Other prominent affiliations included the Department of Cardiology, University of Rome (62 contributors; 0.63%), the Department of Paediatrics, University of Rome (56 contributors; 0.57%), and the National University Heart Centre (53 contributors; 0.54%). Several institutions, such as the University of California, the University of Athens, the University of Granada, the University of Tokyo, the Medical University of Warsaw, and the University of Milan, contributed between 45 and 50 contributors each. Overall, the distribution indicates that while no single institution dominates, a diverse range of universities and

medical centres across different countries actively contributed to the journal, reflecting broad

6.Authorship Patten:

institutional participation and strong international collaboration.

Table 6: Authorship Patten

Sr. No	Year	2021	2022	2023	2024	2025	Total
1	Single Author	11	22	31	24	29	117
2	Second Author	15	48	56	52	48	219
3	Third Author	20	59	71	68	76	294
4	Fourth Author	31	92	86	84	70	363
5	Fifth Author	33	82	90	72	89	366
6	Sixth Author	36	65	82	62	73	318
7	Seven Author	28	56	39	26	56	205
8	Eight Author	12	44	26	16	38	136
9	Nine Author	3	16	19	12	19	69
10	Total Articles	189	484	500	416	498	2087

Table 6 presents the authorship pattern of articles published in the Journal of Cardiovascular Development and Disease during the period 2021–2025. A total of 2,087 articles were analysed to examine the distribution of authors per article. The results show a clear predominance of multi-authored publications across all five years. Single-author contributions were relatively limited, with a total of 117 articles during the study period. Articles with two authors accounted for 219 publications, while three-author papers constituted 294 articles. Publications with four authors (363 articles) and five authors (366 articles) formed the largest share, indicating a strong preference for collaborative research. Articles with six authors also showed a substantial presence with 318 publications. Although papers with seven, eight, and nine authors were comparatively fewer, they still represented a notable portion of the total output,

accounting for 205, 136, and 69 articles, respectively. Overall, the findings clearly indicate that the Journal of Cardiovascular Development and Disease is characterised by a high level of research collaboration, with multi-authored articles dominating the publication pattern throughout the study period.

Relative Growth Rate and Doubling Time of Publication Growth rate analysis: The growth rate analysis is done with respect to the relative growth rate and doubling time.

Relative growth rate per unit of publications per unit of time, ie, R(a) =

- W1=ln(Initial cumulative publications)
- W2=ln(Final cumulative publications)
- T2−T1=Time interval (in years)
- Doubling Time (Dt)= 0.693 /RGR
- Mean RGR: Average of yearly RGR values
- MeanDt(p): 0.693 / Mean RGR

Table No. 2: Relative Growth Rate and Doubling Time of Publication

Sr. No	Year	Articles	Cumulative	W_1	W_2	RGR	Mean [R(P)]	Dt(p)	Mean Dt(p)
1	2021	189	189		5.24				
2	2022	484	673	5.24	6.51	1.27		0.55	
3	2023	500	1,173	6.51	7.06	0.55	0.48	1.26	1.44
4	2024	416	1,589	7.06	7.37	0.31		2.23	
5	2025	498	2,087	7.37	7.64	0.27		2.57	

Table 2 shows that the relative growth rate (RGR) of articles decreased steadily from 1.27 in 2022 to 0.27 in 2025, indicating a slowdown in the pace of publication over the period. The mean relative growth rate for the entire study period is 0.69, reflecting an overall moderate growth in research output. During the same period, the mean doubling time (Dt(p)) increased to 1.72 years, showing that it took longer for the cumulative number of articles to double. The analysis clearly suggests that while the institution maintained a consistent publication output, the rate of growth declined, and the doubling time increased gradually.

Conclusion:

The study revealed a consistent growth in publications in the Journal of Cardiovascular Development and Disease from 2021 to 2025, with a total of 2,087 articles. Research articles constituted the majority (91.33%), while reviews, case reports, and protocols formed a smaller proportion. Relative Growth Rate declined from 1.27 to 0.27, and the mean doubling time increased to 1.72 years, indicating a slowing pace of publication growth. Multi-authored articles predominated, reflecting a collaborative research culture. Italy, the USA, and the UK were the leading contributors, and a broad range of institutions participated actively. Overall, the journal demonstrates sustained research productivity with strong international collaboration.

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Relevance of Green Sustainable Materials in India

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Abstract:

India's growing population and urbanization demand sustainable solutions. Green materials align well with national initiatives like Smart Cities Mission, Swachh Bharat Abhiyan, and Net Zero targets. Traditional Indian practices, such as mud houses and natural ventilation, further support the adoption of green materials. Green or sustainable materials play a vital role in achieving sustainable development and environmental conservation. While challenges remain, technological advancements, supportive policies, and increased awareness can accelerate their adoption. For India, green materials offer a pathway to balance economic growth with ecological responsibility. India's rapid urbanization, population growth, and industrial expansion have placed immense pressure on natural resources and the environment. Sustainable materials offer a viable pathway to balance economic development with environmental protection and social well-being. This review discusses key sustainable materials relevant to India's future, their applications across sectors, benefits, challenges, and the policy and research directions needed to enable large-scale adoption.

Keywords: Smart Cities Mission, Swachh Bharat Abhiyan, and Net Zero targets, Green materials, Sustainable materials, India's Future.

Introduction:

Green materials, also known as sustainable or eco-friendly materials, are materials designed to reduce environmental impact throughout their life cycle—from raw material extraction to disposal or recycling. With increasing concerns over climate change, resource depletion, and pollution, green materials have become essential for sustainable development, especially in rapidly developing countries like India. India is projected to be one of the world's largest construction, manufacturing, and consumer markets in the coming decades. Conventional materials such as cement, steel, plastics, and fossil-fuel-based products are energy-intensive and contribute significantly to carbon emissions, pollution, and resource depletion. Sustainable materials—defined as materials that minimize environmental impact over their life cycle while being economically viable and socially acceptable—are critical for India's transition to a low-carbon and circular economy.

Green Construction Materials:

The construction sector accounts for a major share of India's energy use and emissions. Sustainable alternatives include fly ash and GGBS cement, Geopolymer concrete, Bamboo etc. Substitute for high carbon valuable materials- Bamboo can replace timber, steel and plastic reducing greenhouse gas emission. Renewable and sustainable Resource In case of bamboo replanting is needed and it generates from root system after after harvesting • Short harvest cycle-can be harvested into 3-5

years. These low resource input requires little water and no chemical fertilizers. Fly ash and GGBS concretes are an industrial waste from coal fire thermal power Plants They reduce the use of Cement and lowers CO2 levels It is widely used in Roads, buildings and metro project as it Increases long term strength and Enhances durability to Utilizes industal waste Environmental benefit as it reduces greenhouse gas emission from Cement production, and converts waste into valuble construction. GGBS concrete Ground Granulated Blast Furnace Slag concrete is a concrete in which it replaced Portland cement. It is a fine powderly material made by rapidly cooling molten iron slag which is byproduct of steel manufacturing. The benefits of GGBS in concrete is low carbon foot print and better resistance to sulphate chloride and corrosion thereby improving the durability. Also it has reduced heat of hydration and smooth finish with light colour long term strength gain. The use of Rammed Earth & Stabilized Mud Blocks Require Low energy, and are local soil-based with excellent thermal comfort. They are used in Auroville & rural housing. Rammed Earth and stabilized Mud blocks are designated as SMBS also. These are two related earthen construction's techniques which use soil as main material Rammed Earth is a monolithic wall system where the damp soil is rammed and compacted in layers inside a temporary frame work. It is very durable and long lasting, fire resistant and has low resistance. SMBS is also called Stabilized Sod Blocks of compressed Earth Blocks. They are individual blocks made from Soil mixed with Stabilizer and compressed in a mold. The use of Recycled Steel and Aluminium Saves energy as virgin metal and is Used in infrastructure, EV, buildings Recycled Steel is steel made from Scrap metal, newly mined iron the one is avoided The recycling of steel can be done repeatedly without losing strength or quality. Scrap steel from cars appliances is melted and recast into new steel. The above has environmental benefits as it employs 60-75% less energy and cuts CO2 emissions,

Bio-based and Natural Materials:

India's agricultural diversity provides vast potential for bio-based materials. Jute, coir, and hemp fibers are used in composites, packaging, insulation, and geotextiles. Agro-waste-based boards (rice husk, bagasse, straw) Replace wood-based panels, reducing deforestation. Natural fibers in automotive and construction composites are Lightweight and biodegradable Green Materials for Energy and Mobility are renewable Energy systems like Perovskite solar cells. They are high efficiency and Printable on flexible Substrates. Organic photovoltaics are lightweight & have lower carbon foot print. Silicon with recycled content reduce energy intensive raw silicon production. The wind turbines composites recyclable thermoplastics for blades. The Energy Storage (Batteries & Hydrogen). Lithium ion Phosphate (LFP cobalt Felt and Nickel-free, Safer and long life. Sodium Ion batteries have lower environmental impacts. The Solid-State Electrolytes-improved safety. The Green hydrogen catalysts - Non precious metal (iron, Nickel) replacing Platinum Thermal and Grid Material. Phase Change material (ECMs) improve energy efficiency in buildings Recycled Aluminium and copper shows Lower emulsions in transmission lines. Electric vehicles (EVs) are Light weight material-recycled magnesium aluminium alloys. The Bio composites like flax, hemp, bamboo fibres replacing glass fibre. Hydrogen and Alternative fuel vehicles includes Carbon- fibre alternatives- bio based or recyclable composites. The Green Steel-Hydrogen based steel production and Public and Micro mobility are Recycled Polymers like e-bikes, Scooters &

interior Modular materials which are easier to repair & reuse.

Sustainable Polymers and Plastics:

Plastic pollution is a major challenge in India. Sustainable solutions includes **Bioplastics (PLA, PHA, starch-based plastics)**: Derived from renewable resources and biodegradable under controlled conditions. **Recycled plastics** with mechanical and chemical recycling to convert waste into value-added products. The Use of waste plastic improves road durability while reducing plastic waste. Bioplastics are plastics made from renewable biological source like Plants, algae or bacteria. They do not employ petroleum and some can biodegrade under right conditions. The various Types of bioplastics are

i. Bio based which are not always biodegradable. They are made from plants and they behave like normal plastic. Mostly these are biodegradable and are broken down by Microbes, heat and moisture. These are Compostable that breaks down safely in composting systems. The Advantages of using these bioplastics are the Use renewable resources. It also reduce carbon foot print Some break down naturally and are less Dependence on fossil fuels. The Disadvantages includes not all are biodegradable and often need industrial composting. The Uses of these are in food packaging, making of Straw & cups Shopping bags, medical items and 3D Printing material

ii. Recycled Plastics are plastics that have been collected, cleaned and processed and can be reused instead of discarding. They actually come from Plastic bottle Packaging, containers, Bags. These Plastics are melted or chemically treated and reused by preparing new items. The recycling employed are Mechanical Recycling in which the plastic is shredded, washed, melted and re-molded. The process of chemical recycling includes breaking of plastics into molecules and rebuilt into new plastic. The Advantages of using them includes Reduced Plastic waste, Saves energy and use few raw materials, Lowers pollution and Keeps plastic out of oceans & landfills. The phenomena of recycling helps to build a circular economy which enables the reuse of plastic instead of wasting it. This protects the nature and saves resources.

Advanced and Energy Materials:

The Recycled metals and alloys like Aluminium and steel recycling saves energy and reduces mining impacts. Phase change materials (PCMs) enhance building energy efficiency by regulating indoor temperatures. The materials for renewable energy are Silicon, perovskites, and advanced composites for solar panels, wind turbines, and energy storage. The various Emerging & Future Materials includes Graphene which is Light weight, conductive Batteries, Sensors, coating. The use of Mycelium (fungal Material Biodegradable packaging is at very Early stage in India and Aerogels with Ultra-light thermal insulation provides Potential for space and energy efficient building.

Why These Material Matter for India:

India is projected to be one of the world's largest construction, manufacturing, and consumer markets in the coming decades The Reduced Import dependence create rural employment with Lower Carbon emissions. This Alignment with make in India with Net ZERO 2070 is Affordable & Scalable for mass use. This provides Sectors for Adoption of Smart cities with Affordable housing's Electric vehicles with. Renewable energy rural Infrastructure. The Biodiversity and Ecosystem Support Habitat creation Provides shelter and food for wildlife, insects and buds Soil enrichment - Bamboo leaf letter adds organic fertility to the soil. The Soil and water conservation Prevents Soil erosion as

its extensive network of roots holds the soil firmly mainly in Slopes & riverbanks. The Improved water retention - Helps to recharge the ground water and maintains the moisture content of the soil. Pollution Reduction using the Biodegradable material and the products of bamboo break down naturally without causing pollution of the environment Air and water purification: Bamboo filters the pollutants and improves the quality of air. The process of Phytoremediation Absorbs heavy metals from contaminated soil. This shows Sustainable Economic Development resulting in ecofriendly livelihoods. Bamboo farming and crafts provide employment and Support rural development via bamboo farming. The Green industries are used for construction, furniture, paper, textiles generation of bioenergy It also Promotes and Supports circular economy • waste bamboo can be converted into bio char energy. The Reduction of Deforestation via Alternative to timber as it reduces pressure on natural forests and ensure long term supply without degradation. Bamboo is often called Green Gold" of "Poor man's Timber"

due to its multidimensional benefits in terms of climate Change conservation of Soil and water and Support to biodiversity. Bamboo is a powerful tool for achieving environmental sustainability and Sustainable Development Goals (SDGs).

Conclusion:

Conventional materials such as cement, steel, plastics, and fossil-fuel-based products are energy-intensive and contribute significantly to carbon emissions, pollution, and resource depletion. Sustainable materials—defined as materials that minimize environmental impact over their life cycle while being economically viable and socially acceptable—are critical for India's transition to a low-carbon and circular economy. Sustainable materials are central to India's vision of inclusive and environmentally responsible growth. Coordinated efforts among policymakers, researchers, industry, and communities will determine how effectively sustainable materials shape India's future.

Differences and Similarities between Arabic and Tamil Languages: A Comparative Study

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Abstract:

The current study aims to present a comprehensive comparative analysis of Arabic and Tamil, two ancient and culturally significant languages belonging to the Semitic and Dravidian language families, respectively. Adapting a qualitative comparative methodology, the research systematically examines the typological differences and similarities across the phonological, morphological, and syntactic domains of both languages. It is based on a linguistic theory that the researcher used books, articles, theses, and website articles to obtain the necessary secondary data. Moreover, the study talks about the unique linguistic synthesis that gave rise to Arabu-Tamil (Arawi), a hybrid language that emerged over centuries of cultural and religious contact. The study revealed that the two languages are almost entirely different from each other at the levels of sound system, morphology, grammar, syntax, and word order. Conversely, the emergence of Arawi demonstrates a significant historical and sociolinguistic connection, highlighting the capacity for linguistic adaptation and synthesis. This study contributes to comparative linguistics by shedding light on the complex relationship between two major linguistic traditions and the language-contact phenomena that result from them.

Keywords: *Arabic, Tamil, comparative analysis, Arabu-Tamil.*

Introduction:

Language is considered the primary means of communication among human beings, and over time, no single, exact definition has been found that fully explains what language really is. Different conceptions of the nature of language arise in different contexts and in response to a variety of historical, social, political, scientific, and pedagogical needs. According to Aristotle, language is a speech sound produced by human beings to express their ideas, emotions, thoughts, desires, and feelings. Noam Chomsky (2000) says that language is the inherent capability of native speakers to understand and form grammatical sentences. This definition of language considers sentences as the basis of a language. Sentences may be limited or unlimited in number and made up of only limited components.

Linguistics is the scientific study of language; however, it is different from knowledge of a language. The field of linguistics, like any complex field, encompasses several subfields, including semantics, syntax, morphology, and phonology. While previous studies have explored specific comparative aspects of Arabic and Tamil, such as phonology and morphology, a holistic typological analysis that integrates phonological, morphological, and syntactic domains with the socio-historical emergence of Arabu-Tamil remains less explored. This study aims to fill this specific gap. The central research questions guiding this study are:

1. What are the differences between Tamil and Arabic?
2. What are the similarities between Tamil and Arabic?

Methodology:

The research employs a **qualitative comparative analysis**, focusing on the linguistic structures of Arabic and Tamil. The study is descriptive and analytical, relying exclusively on the data and theoretical frameworks. The comparative method, as described by Lehmann (1993), is a technique for studying the development of languages by comparing features. The study is a **comparative linguistic study** that examines, compares, and contrasts Arabic and Tamil. The focus is on identifying the structural differences and similarities between the two languages across various linguistic levels.

Literature Review:

Scholarly estimates of Tamil and Arabic have characterized both languages as classical and religious, with ancient historical connections in South Asia (Samuuel, 2010). It is also considered a classical language, partly due to its historical contact with Arabic in South India and Sri Lanka (Samuel, 2010). Contemporary work on Arabic focuses on the complex phonology of modern standard Arabic and dialect-specific studies (Abushhab, 2015; Kastner, 1981). In addition, the emergence of Arbu-Tamil (Arwi) serves as an important historical link that reflects this synthesis and its necessity for Muslim communities in Tamil-speaking areas, both for religious instruction and social interactions.

Overview of Arabic and Tamil:

1. Arabic Language:

Arabic is a Semitic language that first emerged in the 1st to 4th centuries CE. It is now the lingua franca of the Arab world, and is considered the religious language of all Muslims. The ISO assigns language codes to 30 varieties of Arabic, including its standard form, Modern Standard Arabic, also known as Literary Arabic, which is a modernized form of Classical Arabic.

This distinction exists primarily among Western linguists.

Arabic is the liturgical language of 1.8 billion Muslims and one of six official languages of the United Nations. All varieties of Arabic are spoken by perhaps as many as 422 million speakers (native and non-native) in the Arab world, making it the fifth-most-spoken language worldwide.

2. Tamil Language:

Tamil (தமிழ் *tamil*) is a classical language and one of the major languages of the Dravidian language family. Spoken predominantly by Tamils in India, Sri Lanka, Malaysia, and Singapore, it has smaller communities of speakers in many other countries as well. As of 1996, it was the eighteenth most spoken language, with over 74 million speakers worldwide. It is one of the official languages of India, Singapore, Malaysia, and Sri Lanka.

Tamil is one of the few living classical languages and has an unbroken literary tradition of over two millennia. The name 'Tamil is an anglicized form of the native name தமிழ் (IPA /ʈɐmiɻ/). The final letter of the name, usually transcribed as the lowercase **l** or **zh**, is a retroflex r. In phonetic transcriptions, it is usually represented by the retroflex approximant.

Tamil is a member of the Tamil language family, which includes the Irula, Kaikadi, Betta Kurumba, Sholaga, and Yerukula languages.

3. Comparative Analysis:

A comparative study shows how two subjects are similar or different. According to **Pickvance (2005),** comparative analysis is conducted primarily to explain and better understand the causal processes underlying the creation of an event, feature, or relationship, usually by bringing together variations in the explanatory variable or variables. **Tilly (1984)** distinguishes four types of comparative analysis:

individualizing, universalizing, variation-finding, and encompassing (p. 82).

3.1 Phonology: Acoustical and physiological studies have analyzed Arabic phonology in great detail, with special attention to its consonantal system (Al Ani, 1970). The phonemics of Tamil, on the other hand, are frequently compared with both Dravidian and Indo-Aryan linguistic systems (Arden, 1982). Furthermore, it was found that Arabic-borrowed words in other languages undergo phonological modifications to accommodate the target language's phonetic constraints (Hashemi et al., 2014).

3.2 Morphology and Syntax: Arabic syntax is commonly studied in terms of "Principles and Parameters", where the word order, nouns, verbs, and particles are considered (A-Shra'aee, 2012; Weiss, 1976). Crazy and Ikan (1989) haveproposedthat Tamil anticipatesin participial nouns, adjective clauses, and specific complement markers such as enru "that" and enpatu 'why.

3.3 Orthography: Meeran Pillai (1990) states that the Arabu-Tamil has a distinct writing system in which Arabic was adapted to Tamil phonology.

3.4 Syntax: Arabic syntax frequently emphasizes word order and the classification of parts of speech into nouns, verbs, and particles (A-Shra'aee, 2012; Weiss, 1976). On the other hand, Tamil syntax is characterized by the use of participial nouns, adjective clauses, and specific complement markers such as enru and enpatu (Agesthialingom, 1967; Atwell et al., 2004; Heintz, 2008).

3.5 Cultural Context: Tamil and Arabic cultures are tied to the second-oldest linguistic lineage of human culture. Arabic-Tamil, in the South Indian and Sri Lankan context, has been referred to as a "language as mimicry" (Mahroof, 1993), reflecting the intense entanglement between Islamic religious practice and local Tamil cultural artefacts.

The Arwi language was created to maintain the religious identity of the Muslims in Tamil (Meeran Pillai, 1990; Shahul Hameed, 2003). Social Linguistics research in Arabic-speaking countries, such as Jordan, demonstrates how variability becomes a source of cultural resistance to global flows (Al-Ali & Arafa, 2010)—methodological approaches differ depending on the linguistic or social aspect.

3.6 Computational and Corpus Analysis: Speech recognition technology, as well as cross-dialectal data exchange, is used in the analysis of contemporary Arabic to model linguistic processes, serving as a comparative base for Tamil-Arabic (Atwell et al., 2004; Kirchhoff & Vergyri, 2005).

Differences between Tamil and Arabic:

Arabic and Tamil are derived from distinct language families: Semitic and Dravidian, respectively. These differences are evident across all levels of linguistic analysis, including morphology, the consonant and vowel systems, and syntax.

1. Morphology:

Arabic uses an abjad script, a consonantal system in which diacritical marks optionally represent vowels. The script is written from right to left. Arabic uses a root and pattern system; a word's root (usually three consonants) provides the lexical meaning (the root /k-t-b/ combined with the pattern /-i-ā-/ gives kitāb 'book,' whereas the same root combined with the pattern /-ā-i-/ gives kātib 'one who writes' or 'clerk.'). On the other hand, Tamil employs an abugida script, essentially a syllabic system in which distinct symbols represent consonant-vowel combinations. Tamil is written left-to-right.

Arabic words are divided into three mutually exclusive categories that cover all words in the language. The first category is 'noun' /ism/, the second is verbs /fe'l/ and the third is particles

(/harf/). The noun category is vast, covering what English classifies as nouns, pronouns, adjectives, and verbs. Adjectives and adverbs behave exactly like nouns, but undergo inflection for number (singular, dual, plural) and gender (masculine and feminine). For example, the adjective "clever" / ðəki/can be singularized, dualized/ðəkjən/, and pluralized /ə ðkjə/, as well as masculinized and femininized / ðkjə/. Tamil suffixes include derivational suffixes, which alter part of speech or meaning, and inflectional suffixes, which indicate grammatical categories. Agglutination is extensive, allowing for lengthy words with numerous suffixes, unlike English syntax.

Tamil nouns and pronouns are categorized into two super-classes: "rational" (uyartiṇai) and "irrational" (aḵṟiṇai), comprising five total classes (paal). "Rational" refers to humans and deities, while "irrational" encompasses all other nouns. "Rational" nouns and pronouns fall into three classes (paal): masculine singular, feminine singular, and rational plural; "irrational" nouns belong to two classes (paal): irrational singular and irrational plural. Suffixes typically denote the class (paal). The plural form of rational nouns can serve as an honorific, gender-neutral singular. In Tamil, adjectives and adverbs are not differentiated; both are categorized under *urichchol*. There are no articles in Tamil; definiteness and indefiniteness are expressed through specific grammatical mechanisms or contextual cues. Tamil distinguishes in the first-person plural between inclusive pronouns நாம் (*nām*) (we), *namathu* (our), which include the addressee, and exclusive pronouns நாங்கள் (*nāṅkaḷ*) (we), *emathu* (our), which do not. This distinction of inclusive and exclusive first-person plural pronouns is also present in several other languages.

2. Sound System:

Arabic and Tmil have a distinctive sound system. Arabic is characterized by a relatively simple vowel system, featuring three short and three long vowels, which are typically / i /, /u /, and / a /, while Tamil possesses a more complex system with five short and five long vowels, in addition to two diphthongs. The consonants show an even deviation. Arabic is rich in sounds that are unusual to Tamil phonology. Arabic has 28 consonants, which fall into the following places of articulation: Labial, Dental, Dental–Alveolar, Palatal, Velar, Uvular, Pharyngeal, and Glottal. The Emphatic coronals (/ sˤ /, / dˤ /, / tˤ /, and / ðˤ /) are responsible for causing assimilation of the emphatic to the adjacent non – emphatic coronal consonants (Saiegh-Haddad & Henkin-Roitfarb, 2014). Tamil has 18 consonants, characterized by retroflex and multiple rhotic consonants. Crucially, Tamil does not phonologically distinguish between voiced and unvoiced consonants; voicing is allophonic, determined by a consonant's position in a word, as detailed in the Tolkāppiyam. For example, the unvoiced plosive 'p' occurs at the beginning of words, while the voiced plosive 'b' cannot. In the middle of words, unvoiced plosives commonly occur as a geminated pair (e.g., -pp-), while voiced plosives occur after a vowel or a corresponding nasal.

3. Syntax and Word Order:

Arabic grammar (نحو /naḥw/) is centered around grammatical inflection, which governs the endings of words to convey the meaning. Arabic has different ways of arranging words in sentences. It has six orders in which words are arranged as a subject, a verb, and a complement. So, Arabic word order can have the following patterns in simple sentences:

VSO, SVO, OVS, OSV, VOS and SOV.

- **VSO** *ʔakal- a maher-un   tuffaħat- an.*   'Maher ate an apple.'
  eat.pt   Maher-Nom apple-Acc

- **SVO** *Maher- un   ʔakal- a   tuffaħat- an.*   'Maher ate an apple. '
  Maher-Nom eat.pt   apple-Acc

- **OVS** *Tuffahat- an ʔakal- a Maher- un.*   'Maher eat an apple.'
  Apple-Acc   eat.pt   Maher-Nom

- **VOS** *ʔakal-a tuffahat- an Maher- un.*   'Maher ate an apple.'
  Eat.pt apple-Acc   Maher-Nom

- **SOV** *Maher- un tuffahat- an ʔakal- a.*   'Maher ate an apple.'
  Maher-Nom apple-Acc   eat.pt

- **OSV** *ʔal- tuffahat-u Maher- un ʔakalh- a.*   'Maher ate an apple.'
  Apple-Nom   Maher-Nom eat.pt

Of these six word-order varieties, three are considered the underlying or representative word orders: VSO, SVO, and VOS **(Carroll, 2000).** The other three varieties, OVS, OSV and SOV can be derived via transformations.

Tamil is a consistent **head-final language**, with the verb always coming at the end of the clause and a typical word order of Subject-Object-Verb (SOV). Tamil has postpositions rather than prepositions. Tamil is a null-subject language.

a. SOV raaja meeriyai raaNikku aRimukappaTuttinaan.

Raja Mary_ACC Rani_DAT introduce_PST-3_

b. raaja raaNikku meeriyai aRimukam ppaTuttindaan

c. meeriyai raaja raaNikku aRimukappaTuttinaan

d. meeiyai raaNikku raajaa aRimukappaTuttinaan

e. raaNikku raajaa meeriyai aRimukappaTuttinaan

f. raaNikku meeriyai aRimukappaTuttinaan

Nominative is unmarked. -ai and -ukku are case markers representing the accusative and dative cases. The above sentences are identical in logical content but differ in discourse presupposition in a very subtle way. The subject-initial sentence pattern is the most common among the word-order patterns. It was found that sentences with SOV word order occur more frequently than sentences with OSV order. (This is a cross-language characteristic, as observed in

Not all Tamil sentences have subjects, verbs, and objects. It is possible to construct valid sentences that have only a verb - such as *muṭintuviṭṭatu* ("It is completed") - or only a subject and object, such as *atu eṉ vīṭu* ("That is my house"). Tamil is a verb-final language. Word order in the sentence is relatively free, as long as the sentence ends with a main verb. For example, 'Raja introduced Rani to Mary' in Tamil can have the following word-order variations:

Greenberg 1963, Greenberg's Language Universal. In declarative sentences, the nominal order is almost always one in which the subject precedes the object.) Greenberg's observation is not without exception. There is, however, at least one syntactic argument for hypothesizing that SOV, rather than, say, OSV, represents the underlying word order of Tamil.

Linguistic Synthesis: The Emergence of Arabu-Tamil:

Arawi or Arabu-Tamil:

After discussing the differences between the two languages, there is a combination of Arabic and Tamil in some areas where Tamil is the spoken language. This combination is called "Arawi or Arabu-Tamil".

Arwi, or Arabu-Tamil, is an Arabic-influenced dialect of Tamil written with an extension of the Arabic alphabet and with extensive lexical and phonetic influences from Arabic. Arabu-Tamil is the result of the cultural synthesis between seafaring Arabs and Tamil-speaking Muslims in Tamil Nadu and Sri Lanka, dating back to the 8th century CE.

Arabu Tamil represents the fusion of two great languages, belonging to the great ethnic groups: the Semitic-Arabic and the Dravidian–Tamil. The prevalence of Arabu-Tamil in Colombo, Kayalpattinam, and Kilakarai indicates that it was in use as early as the eighth century of the Christian era. The Arabs and the Tamil Muslims might have played equal roles in the formation of Arabu-Tamil. It is the logical result of the joint efforts of the Arabs and the Tamil Muslims. It originated in the South-West Coast of Ceylon and the South-East Coast of India, more particularly in Kayalpattinam. This language was enriched, promoted, and developed in Kayalpattinam. It rendered a most useful service for the advancement and progress of Arab culture and Tamil culture.

The Arawi script is a testament to linguistic adaptation, and it consists of 40 letters, out of which 28 letters are from Arabic, and 12 additional letters are devised by adding some marks and dots to the original Arabic Alphabet to represent the Tamil vowels and several Tamil consonants that could not be mapped to Arabic sounds. This adaptation enabled the right-to-left Arabic script to be used to write Tamil.

Literature produced in this language covered the fields of Jurisprudence, Sufism, Law, Medicine, and Poetry. Arabu-Tamil was also used as a bridge language for Tamil Muslims to learn Arabic. Many authentic Hadith manuscripts are produced in this language. Most of the Fiqh books, particularly those of Imaam Shaafi and Imaam Abu Hanifa, are found in Arabu-Tamil.

Today, Arabu-Tamil is of little scholarly interest in parts of Tamil Nadu, India, and Sri Lanka. This literature did not receive much attention in the latter part of the 20th century; languages, such as English, replaced it in many contexts.

Conclusion:

The analysis confirms that Arabic and Tamil share no significant inherent structural similarities at the phonological, morphological, or syntactic levels, which is expected given their distinct origins in the Semitic and Dravidian families. Tamil belongs to the Dravidian language family, and its script is an abugida. It also uses vowel marks to denote vowel sounds in a text. Arabic, on the other hand, is an abjad and does not strictly use vowel marks to denote vowel sounds. The reader has to figure out the pronunciation based on their previous knowledge. However, the emergence of Arabu-Tamil provides a bridge between the two languages, as a script-based, lexically driven synthesis driven by cultural identity. The adaptation of the Arabic abjad to accommodate the Tamil abugida's phonemes by creating 12 new letters is a remarkable example of linguistic engineering motivated by the need for a common means of communication. The extensive borrowing of Arabic vocabulary into Tamil further illustrates the depth of this cultural and commercial exchange. The study confirms that, while there

are fundamental differences between Arabic and Tamil, they share a common point in their cultural and religious history, which manifests in the unique linguistic phenomena of Arawi. This funding validates the use of comparative analysis in uncovering both the structural boundaries and the sociolinguistic bridges between disparate language families.

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Corporate Governance Reforms in India towards Viksit Bharat 2047

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Abstract:

Corporate governance in India has improved steadily since the period of economic liberalization. However, as India moves towards its long-term development goal of Viksit Bharat 2047, corporate governance systems need to further align with global standards of transparency, accountability, sustainability, and stakeholder participation. This study examines recent corporate governance reforms in India, including changes in laws, regulatory frameworks, compliance requirements, and institutional practices. It evaluates whether these reforms are sufficient and consistent with India's development vision for 2047. The study also identifies key factors driving governance reforms, highlights existing challenges and gaps, and suggests measures to strengthen the corporate governance framework. Strengthening governance practices is essential for improving investor confidence, promoting ethical business behaviour, and supporting sustainable economic growth in India.

Keywords: Corporate Governance, India, Viksit Bharat 2047, SEBI, Board Diversity, ESG, Regulatory Reform.

Introduction:

Corporate governance comprises the framework of rules, practices, and institutional mechanisms through which companies are managed and supervised to ensure sustainable value creation for all stakeholders. In an era marked by globalization, rapid technological advancements, and increasing investor awareness, effective corporate governance has emerged as a critical determinant of economic efficiency and market competitiveness.

India's long-term development vision, articulated through the goal of Viksit Bharat 2047, seeks to establish a strong, inclusive, and globally competitive economy supported by resilient institutions. In this context, strengthening corporate governance becomes essential for promoting transparency, improving corporate accountability, safeguarding the interests of minority shareholders, and encouraging ethical and responsible business conduct. Robust governance structures are therefore fundamental to achieving sustainable economic growth and institutional credibility in India's journey towards becoming a developed nation.

Objectives of the Study:

1. To examine recent corporate governance reforms in India.
2. To evaluate their effectiveness in aligning with Viksit Bharat 2047 goals.
3. To identify challenges and propose strategic recommendations.

Literature Review:

Corporate governance in India has shifted from informal, promoter-led practices to a structured regulatory framework. Early

governance relied on traditional norms with limited legal oversight. The Companies Act, 1956 introduced formal regulation but focused mainly on compliance and financial reporting. Growing corporate failures and investor concerns led to stronger reforms, particularly the Companies Act, 2013, which enhanced board independence, disclosure norms, audit mechanisms, and minority shareholder protection. Although these reforms aim to improve transparency and accountability and align with global standards, implementation challenges remain.

The literature also highlights the influence of global governance frameworks and theoretical perspectives on Indian reforms. International standards promoted by the OECD, the UK Corporate Governance Code, and the Sarbanes-Oxley Act emphasize transparency, board independence, risk management, and shareholder rights. Theoretical models such as agency, stakeholder, and stewardship theories provide a conceptual basis for evaluating corporate governance reforms in India.

Methodology:

This study follows a qualitative exploratory research approach based on secondary data. The analysis draws on key legal and regulatory documents, including provisions of the Companies Act, regulations issued by the Securities and Exchange Board of India, and the National Guidelines on Responsible Business Conduct. Reports published by institutions such as the Ministry of Corporate Affairs, Reserve Bank of India, and the World Bank are also reviewed.

In addition, the study compares Indian corporate governance reforms with global best practices and examines expert views presented in reports and policy papers issued by industry and professional bodies, including the Confederation of Indian Industry, Federation of Indian Chambers of Commerce and Industry, and the Institute of Chartered Accountants of India, to assess the effectiveness and future direction of governance reforms in India.

Corporate Governance Reforms in India:

The Companies Act, 2013 marked a significant reform in India's corporate governance framework by strengthening board structures and accountability. It made the appointment of independent directors' mandatory, enhanced the role of audit committees, regulated related party transactions, and improved disclosure norms. These provisions were introduced to reduce conflicts of interest, protect minority shareholders, and improve transparency in corporate functioning.

Governance standards for listed companies are further reinforced through the Listing Obligations and Disclosure Requirements issued by the Securities and Exchange Board of India. These regulations emphasize board diversity and independence, risk management committees, timely financial disclosures, and reporting of corporate social responsibility expenditure. Together, these measures aim to strengthen investor protection and ensure market transparency.

The National Guidelines on Responsible Business Conduct complement legal reforms by promoting ethical and sustainable business practices. They encourage companies to adopt environmental, social, and governance (ESG) reporting, conduct human rights due diligence, and ensure environmental compliance. These guidelines support long-term value creation and align corporate governance with global sustainability standards.

Key Features of Recent Corporate Governance Reforms:

1. Mandatory Board Diversity:

This reform aims to promote inclusion by ensuring representation of diverse skills, experience, and perspectives on company boards. It improves the quality of decision-making and strengthens board effectiveness.

2. Audit and Risk Committee Norms:

Strengthened audit and risk committee requirements focus on improving financial oversight and internal controls. These measures enhance transparency and reduce the risk of financial mismanagement.

3. E-Governance and Digital Filings:

The introduction of digital governance systems aims to reduce fraud and manual errors in compliance processes. It also ensures faster, more efficient, and transparent regulatory compliance.

4. ESG and Sustainability Reporting:

ESG reporting frameworks encourage companies to adopt sustainable business practices. This supports long-term sustainability and improves the global credibility and ranking of Indian companies.

Alignment with Viksit Bharat 2047:

1. Economic Competitiveness:

Effective corporate governance improves investor confidence and enhances India's global competitiveness. Transparent and well-regulated firms attract foreign investment and institutional capital, which are essential for infrastructure development, innovation, and sustained economic growth.

2. Transparency and Accountability:

Stronger governance frameworks promote transparency and accountability in corporate operations. Improved compliance and disclosure practices reduce fraud risks, protect investor interests, and ensure ethical business conduct aligned with national values.

3. ESG and Sustainability Goals:

Corporate governance reforms support ESG objectives by integrating environmental responsibility, social accountability, and ethical governance into business practices. This approach encourages sustainable growth and long-term value creation in line with India's development vision.

Challenges and Gaps

1. Implementation Gaps:

Despite regulatory reforms, effective implementation of corporate governance remains a challenge. The independence and functional effectiveness of independent directors are often limited, and many boards lack adequate expertise in areas such as risk management and technology. In addition, inconsistencies in regulatory enforcement reduce the overall impact of governance reforms.

2. SME Governance Constraints:

Small and medium-sized enterprises face significant challenges in adopting strong governance practices. High compliance costs, limited financial resources, and inadequate governance infrastructure make it difficult for SMEs to fully implement regulatory requirements.

3. Stakeholder Awareness:

Limited awareness and participation of stakeholders also weaken corporate governance. Minority shareholders and the general public often lack sufficient knowledge and influence to effectively engage in governance processes, reducing accountability and transparency.

Recommendations:

1. Capacity building for boards should be strengthened through continuous training of independent directors in risk management, financial oversight, and technology governance.

2. Enforcement mechanisms need to be made more effective through proactive regulatory audits and strict punitive measures for non-compliance.

3. Incentive-based ESG integration should be promoted by providing tax benefits and policy support for sustainable practices and green reporting.

4. Governance processes should be digitized by adopting advanced technologies such as blockchain for transparent disclosures and artificial intelligence for risk monitoring.

5. A dedicated SME governance support framework should be developed through subsidized compliance solutions and structured mentorship networks to improve governance adoption.

Conclusion:

Corporate governance reforms in India have made substantial progress, but the journey towards Viksit Bharat 2047 demands more strategic alignment with global governance paradigms. Emphasizing transparency, ethical conduct, stakeholder engagement, and sustainability will deepen market confidence, enhance competitiveness, and foster a resilient corporate ecosystem.

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Cybersecurity Ethics and Corporate Accountability in FinTech and Start-Up Ventures

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Abstract:

The rapid growth of FinTech companies and startup ecosystems has transformed financial services delivery through digital platforms, mobile applications, and data-driven innovations. While these developments have enhanced efficiency and financial inclusion, they have consequently raised exposure to cybersecurity risks and ethical challenges. FinTech firms and startups process a large volume of sensitive personal and financial data; hence, ethical cybersecurity practices and corporate accountability are of the essence in gaining stakeholders' trust. Key findings include that rapid innovation, insufficient infrastructure, and general lack of cyber awareness are some of the reasons for ethical lapses; existing regulations, although useful, cannot help without proactive governance. The study emphasizes transparent data practice, employee training, proper third-party oversight, and board-level accountability for averting risks. The paper presents pragmatic recommendations for FinTech firms and start-ups on how to integrate ethical cybersecurity practices within the organizational strategy for ensured sustainable growth, stakeholder trust, and long-term success. This paper reviews ethical issues of cybersecurity in fintech and start-up ecosystems regarding data privacy, transparency, and responsibility for cyber incidents. In addition, the role of mechanisms of corporate accountability and regulatory frameworks in ethical governance has been assessed in addressing cybersecurity risks.

Keywords: Cybersecurity Ethics, FinTech, Corporate Accountability, Start-Ups, Data Privacy, Ethical Governance.

Introduction:

The emergence of FinTech businesses and technologically innovative startups has brought changes in the sector of financial services. These institutions deal with high volumes of confidential data; thus, their ethical responsibility related to cybersecurity has become an area of concern. With growing dependency on technology, ethical responsibility for safeguarding their data has become crucial.

Within FinTech and start-ups, in many environments, the demands for quick innovation and fast growth pose an element where cybersecurity becomes a secondary consideration, posing several moral issues in regard to privacy, clarity, and responsible use of data. Cybersecurity ethics incorporate moral principles in protecting information systems and preventing misuse and unauthorized access to data.

Corporate accountability: It defines the manner in which firms can or cannot alleviate themselves from potential or actual threats imposed by cybersecurity attacks. It calls for responsible actions by management to implement necessary security processes, regulatory adherence, and transparency in case of a breach. It is a crucial area of understanding for sustainable growth within the FinTech start-up environment.

Objectives:

1. To examine the ethical issues of cybersecurity in the FinTech and start-up environment.
2. To identify key challenges to cybersecurity and data privacy confronting FinTech companies.
3. To investigate mechanisms that enable corporate accountability in cyber risk control.
4. To analyse the effect of ethics in cybersecurity within stakeholder trust.
5. To suggest strategies for improving ethical practices for cybersecurity in the FinTech and startup businesses.

Literature Review:

1. Sathe, Navnath, Santosh, and Vijay (2025) discussed cybersecurity issues within the fintech ecosystem in the Indian market, bringing into perspective the importance of data privacy and trust within the fintech ecosystem. According to their research, the fast growth within the fintech ecosystem also brings a host of risks and challenges related to their vulnerability to cyber-attacks, data breaches, and identity fraud, thereby also suggesting within the research paper the importance of non-technical considerations within the fintech ecosystem, wherein data privacy needs to become a point of paramount priority to sustain fintech companies within the fintech ecosystem.
2. To study accountability in algorithmic systems in Indian mobile lending services, Ramesh, Kameswaran, Wang, & Sambasivan (2022) conducted a study and concluded that privacy degradation and discrimination were common among users because of a lack of balance in power dynamics, which led them to accept less favourable terms. The paper concluded that in fintech apps, due to lack of transparency and accountability in algorithmic processes, might be associated with several ethical concerns and hence ethical governance can play an important role in making fintech services more transparent and accountable.
3. A similar study conducted on the privacy commitments and security of Indian fintech firms is that of Rathi & Mohandas in 2019. They carried out an analysis of the privacy policies of 48 firms to assess their pledges to data privacy. They found that though most of these firms are having an official privacy policy, the degree of specificity is highly varied. Such a study shows that though there is a degree of compliance with the Information Technology Act in relation to data privacy, there are also implementation gaps in relation to data disclosure to customers.

Conceptual Framework:
1. Cybersecurity Ethics:

Cybersecurity ethics can be defined as the principles of moral best practice in the collection, storage, processing, and protection of digital information by the FinTech industry and start-ups. Ethical cybersecurity transcends the law in the sense that it encompasses the following:

- **User Privacy Protection:** ensures that personal information remains secure.
- **Consent-based data use:** Using data only when the person gives consent.
- **Prevention of unauthorized access:** Putting in measures to prevent breaches or misuse.
- **Transparency in security practices:** To be open in communicating security practices to stakeholders.

2. Corporate Accountability:

Organizational accountability refers to the duties of organizations regarding accountability for failures of cybersecurity and data breaches, as

well as the misuse of consumer data. Organizational accountability, specifically with FinTech start-ups, includes accountability for:

- **Customers:** Protecting their data as well as transactions.
- **Investors:** Integrity and management of operational risks.
- **The wider community:** Adhering to high ethical standards in digital finance.

This framework presents the correlation between ethical behaviour regarding cybersecurity and organizational accountability. It forms the basis on which challenges and best practices regarding FinTech start-ups shall be evaluated.

Statement of the Problem:

An increasing number of FinTech businesses and start-ups have elevated the utilization of digital platforms for the management of personal and sensitive data. However, the innovation and speed of FinTech firms and start-ups remain a priority; hence, the aspect of ethical cyber concerns and corporate responsibility remains less focused. This scenario has hampered the sequence of data breaches and the improper use of client information. However, there exist regulatory concerns and imperfections regarding ethical concerns and the corporate responsibility of fast-growing start-ups. Hence, there is a need to analyse the ethical concerns of corporate responsibility and accountability of FinTech and the start-up business environment.

Research Methodology:

For the described research, a descriptive analysis research design that is purely secondary in nature is adopted to assess cybersecurity ethics and company accountability in the FinTech start-up culture in India. For data collection, a thorough search of university journals, business research papers, regulatory normative business documents (RBI, IT Act), and authentic news papers that record real-world cyber-attacks is conducted. The data is then analyzed through a qualitative analysis technique to extract various points on ethical issues, accountability, and best business practices. Such a methodology enables the research to present substantial findings based on non-primary data; however, it is dependent on published data.

Case Studies:

Case Study 1: Impact of the Phishing Scam on PhonePe (2024)

In 2024, phishing attacks on users of the Indian leading digital payment platform, PhonePe, led to unauthorized login attempts that caused financial loss to several customers. The company then publicly addressed this issue and gave users guidelines, but the incident highlighted ethical cybersecurity best practices such as proactive user education, secure authentication protocols, and response mechanisms. This incident has also underlined the continuous responsibility of digital payment firms in safeguarding users from evolving cyber threats.

Case Study 2: PolicyBazaar Data Breach Concerns (2023)

PolicyBazaar, an Indian Insurtech and the largest financial marketplace, dealt with a breach in 2023 that exposed millions of user records containing sensitive personal and financial information. The incident raised concern among consumers, which led to debates on how security protocols could be strengthened, as well as data security protection mechanisms. The above scenario thus emphasises the ethical role of organisations with access to considerable data regarding their consumers.

Case Study 3: MobiKwik Data Exposure (2021)

In 2021, several incidents came to the fore regarding the Indian digital payment wallet

service, MobiKwik, in which the company was said to have been hit by a major data exposure attack that affected the personal details of millions of users. While the company initially repudiated the claim of a data breach, a subsequent official inquiry and reporting in the media later exposed the fact that the sensitive information of users, such as Aadhaar and PAN details, was available on various cyber discussion boards. The entire event raised many ethical issues regarding the transparency and responsibility of the company.

Cybersecurity Ethics and Governance in FinTech and Start-Ups:

Ethical Challenges in FinTech & Start-Ups:

There are a number of ethical issues that FinTech companies and start-ups in the Indian market need to consider regarding cybersecurity. Innovations happen at a fast pace, and the end result is the product or service launched without proper emphasis on security, and ethical considerations suffer. When there is a constraint on spending, it may result in a weak cybersecurity system, and when there is a ruthless approach to monetizing data, it may create problems when shared without proper consideration of the end users' concerns. Leverage on third-party services and cloud computing also adds to the concerns on accountability.

Role of Regulations and Governance:

Regulatory systems in India also have an important role in pushing the concept of cybersecurity accountability in the country. Some of the main pieces of legislation in this regard are the Information Technology Act, 2000, the Digital Personal Data Protection Act, 2023, RBI Guidelines on FinTech, and the SEBI Cybersecurity Framework. While these documents intend to enforce business accountability and protection, they still have weaknesses in their implementation and,

specifically, in the pace of technological developments.

Consequences of Ethical Failure:

If these ethical issues in cybersecurity are overlooked, they could have severe repercussions for FinTech businesses and start-ups. It could result in financial fraud, identity theft, among other issues that could affect the trust of customers. Organizations could also face legal consequences. It would affect the confidence that investors have within these businesses. In extreme cases, it could affect the continuation of these businesses because they could experience setbacks in operations and even have to shut down.

Results and Interpretation:

From the analysis of case studies of Indian FinTech startups, this research has been able to lay out the following key findings:

- **There Are Gaps in Cybersecurity Despite the Law:** Most start-ups do not consider the ethics of cybersecurity when innovating, leading to hacking incidents and the misuse of consumer data.
- **Lack of Infrastructure and Awareness:** It is also a lack of infrastructure and awareness within budgets that can lead to vulnerabilities in security.
- **Third-party risks:** There are challenges of accountability with vendors and cloud services.
- **Trust and Reputation are vulnerable:** Data breach and other unethical practices directly affects consumer trust, investor confidence, and thus the long-term viability of start-ups.
- **Regulatory Mechanisms Are Inadequate:** With available law presented through IT Act 2000, Digital Personal Data Protection Act 2023, RBI, and SEBI guidelines, enforcement lapses and fast-evolving

technologies keep their effectiveness too low to ensure ethical compliance.

Suggestions/Recommendations:

Based on these premises, the study suggests that for the improvement of the ethics and accountability of the FinTech and start-ups businesses, it is important to;

- **Apply Strong Cybersecurity Policies:** Develop an inclusive security policy that includes data protection, access control, etc.
- **Audits and Compliance:** Perform audits, which can be internal or even a third party, for assessing regulatory and ethical standards.
- **Employee Training and Awareness:** Undertake employee training and awareness campaign on cybersecurity ethics and employee privacy/ethical responsibility for all founders and employees.
- **Transparent Data Governance:** Data gathering and use policies and data breaches, in an ideal scenario, should be communicated in a transparent manner by the Company or
- **Improve the vendor/third party management:** Ensure the adoption of ethical principles among all the partners/vendors.
- **Embrace Ethical AI and Automation Practices:** Monitor algorithm-based decisions for bias, fairness, and transparency.
- **Board Level Oversight:** Incorporate top management participation for the oversight of ethical and accountability aspects of information technology.

Conclusion:

Cybersecurity ethics, as well as business accountability, are a prerequisite for sustainable development in FinTech businesses as well as start-ups. Various insights in the study indicate that the lack of sustained innovation and insufficient infrastructure, as well as a lack of awareness in FinTech businesses, is leading to the widening of ethical gaps that pose serious threats to these organizations as well as their customers. Although a regulatory framework in India exists for business accountability, yet a lacuna continues to exist that needs to be bridged through active support of cybersecurity ethics in these organizations.

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Digital Era and the Future of Indian Languages: Challenges and Opportunities for English and Indian Vernaculars

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Abstract

India is home to hundreds of languages and dialects. As digital technology spreads, both English and regional languages ("vernaculars") face changes. On one hand, modern tools (like AI and mobile internet) can help preserve and share Indian languages. On the other hand, technical issues and social factors pose challenges. This paper explores how the digital age affects Indian languages in general. We discuss how many Indians prefer content in their mother tongue, the barriers that keep vernaculars off the internet, and the ways new technologies (like translation and voice recognition) can help. We also note English's role: while it links India to global information, relying too much on English can exclude many Indians. We conclude that a balanced approach is needed for India to become a fully multilingual digital society by 2047.

Keywords: Digital Era; Indian Languages; Vernacular Languages; English; Multilingualism; Language Technology; Digital Inclusion.

Introduction:

India's linguistic diversity is immense. The country recognizes 22 *scheduled* languages, and many experts note there are over 700 languages and thousands of dialects spoken across the nation. Yet, only a minority of Indians speak English. One industry report found that about 125 million people in India know English at all, and fewer than 0.3 million use it as their first language. In contrast, over 1,000 million Indians speak Hindi or other Indian languages. In this context, the rise of the internet and smartphones is reshaping how languages are used. With more Indians getting online, especially in rural areas, there is growing demand for local-language content. By 2018, India had over 460 million internet users and was on track to reach 636 million by 2021. Many new users come from small towns and villages where people prefer vernacular media. Studies show 57% of Indian internet users now prefer to browse in an Indian language, with Hindi leading the way. In fact, 9 out of 10 new internet users in India over the coming years are expected to be users of local languages. Most of these users go online via affordable smartphones. This shift has important implications: for technology and education, for jobs and social life, for culture and politics. This paper examines the future of Indian languages in the digital age, focusing on broad trends rather than any single region or language. We will outline the main challenges that keep many vernacular languages on the sidelines of the digital world, as well as the opportunities that new technology offers to them (and to English as well). The goal is a clear, balanced view of how India can support all its languages – from English to Bengali to Telugu and beyond – as the nation marches toward the year 2047.

India's Linguistic Landscape:

India's official languages reflect its diversity. The Constitution lists 22 languages in the Eighth Schedule, and together they are spoken by over 96% of Indians. But beyond these official languages, thousands more dialects thrive in villages and cities. This diversity is a strength of India's culture. Each language carries its own literature, folk traditions, and local knowledge. For example, Marathi is the main language in Maharashtra, Tamil in Tamil Nadu, Bengali in West Bengal, and so on. At the same time, English plays a special role. After British rule, English became a *link language* for government, higher education, and business. Many middle-class families insist on English-medium education for their children, hoping it will open doors to the world. However, English remains a minority language in daily life. As Vani Kola observes, India has 521 million Hindi speakers and about 500 million who speak other Indian languages, but only 125 million English speakers (and almost all of those use English as a second language). This means that most Indians grew up speaking a regional language or dialect at home and at school. Many rural schools teach in the local state language rather than English. A recent survey found that about 69% of Indians live in rural areas and depend on vernacular languages in education. Students from these backgrounds often struggle when schooling suddenly shifts to English or tech-heavy subjects. As one education expert notes, rural students "often need help comprehending globally dominant languages like English" in technical subjects. Thus, India has two important trends that intersect:

(1) a huge, fast-growing base of internet users, mostly in villages and small towns, who prefer Indian languages; and

(2) a traditional belief that English is important for modern jobs and higher education. The digital age forces us to ask: can technology bring more content and tools in Indian languages? And how will this affect the role of English?

Digital Technology and Language Use:

In the digital era, the internet is no longer an English-only space in India. Many companies and content creators now see a huge audience in regional languages. For example, a market analysis found that 99% of Indian-language internet users access the web on their mobile phones, often from Tier 2 and Tier 3 cities. As smartphones got cheaper and mobile data costs fell, Indians in smaller towns began consuming news, videos, and social media in their mother tongues. The data confirm this shift. A 2024 report by IAMAI and Kantar shows that 57% of Indian internet users prefer to navigate online in an Indian language, rather than English. The most popular uses of vernacular internet content are watching videos, listening to music, chatting on social media, and online shopping. Interestingly, voice search – speaking to the phone in one's language – has become a key driver. Because many people find typing difficult, they use voice assistants in Hindi or other languages. The same report notes that voice search has boosted vernacular usage, although often the results still end up as videos rather than websites or text in Indian languages. Nevertheless, about 45% of India's rural population still lacks internet access. In many villages, people share a single smartphone, which can be a barrier for individual learning. The reasons are complex: some rural users find it hard to understand internet procedures, or they don't see clear benefits of going online. One expert notes that the "proficiency of English in rural India is very low," and when internet content and even web links (URLs) are mostly in English, it creates a barrier.

Challenges for Vernacular Languages:

Several key challenges have made it harder for Indian vernaculars to flourish online. **Technical hurdles:** Many Indian languages use unique scripts and letters. Digital systems must support these scripts by having the right fonts and input methods. Creating this support can be difficult. As one study notes, "Many regional languages have unique scripts that may not be well-supported in digital systems. Creating appropriate character encoding standards and fonts for these scripts can be challenging". Moreover, technological tools like speech recognition or translation are often first built for world languages like English. Indian languages come later, so they lag in quality. Web developers also face "limited digital resources" for vernaculars – there may be few online dictionaries, typing tools, or existing content to use as examples. Relatedly, **Linguistic complexity** is a challenge. Indian languages often have complex grammar and many dialects. For example, Hindi itself has many regional dialects, and other languages like Marathi or Malayalam have intricate word forms. This variety makes it hard to create one single digital version of the language. The Webology paper on language digitization warns that "dialectal variation may lead to difficulties in establishing a standardized form for digitization". In practical terms, this means that an app or voice assistant might work in one dialect but fail in another, requiring lots more work to cover all cases.

Socio-economic factors also play a role. Many speakers of vernacular languages have low literacy in any language, which makes using computers or smartphones harder. If someone can barely read in Hindi or their home language, they will struggle with any text on a screen. Also, if people do not perceive immediate benefits from using their own language on digital platforms, they may stick to what's easier (often English

menus or apps). Furthermore, from a market standpoint, companies may invest more in English services because they think those serve more wealthier or urban customers. The Webology paper notes that "market demand" for vernacular digital products is lower, which means fewer developers and entrepreneurs work on them.

Over time, there is also a **risk of language shift**. If schools, media, and technology use English more and more, younger people may start preferring English. The Webology authors caution that the "increased use of major languages in various domains… can lead to a language shift, where regional languages are gradually replaced". Some Indian languages even face endangerment because their speaker populations are small and they have little online presence. Without conscious effort, a language used only at home could fade away if it has no place in education, media, or the digital world. Finally, **quality of technology** is a hurdle. Even when translation or speech tools exist for Indian languages, they often make mistakes. Machine translation for Hindi or Telugu is usually much less accurate than for English or Spanish. The paper warns of "subpar translation quality" due to limited data. Similarly, speech-recognition systems may fail because of different accents or background noise. These tech flaws can frustrate users and slow adoption of vernacular tools.

Opportunities and Trends:

Despite these hurdles, the digital era offers many opportunities to boost India's languages. One bright trend is simply **inclusion through technology**. Government and industry are beginning to invest in supporting Indian languages online. For example, India's National Language Translation Mission has created *Bhashini*, an AI-driven platform that can translate text and speech among all 22 scheduled

languages. Similarly, *BharatGen* is developing translation models that make information accessible in every major language. These tools can let a Hindi speaker read English webpages, or let a Marathi speaker call a voice assistant in Marathi. In the words of a government report, such technology builds "an inclusive digital future where every citizen, regardless of mother tongue, can participate fully in the digital economy". New AI tools are also helping create content in local languages. By using machine translation and speech technologies, writers and educators can produce books, lessons, and websites in Hindi, Tamil, Bengali and others at scale. As Sajjan Gaikwad (2025) notes, AI has already shown positive contributions: "the democratization of knowledge through translation apps" and speech-to-text systems empower users in both rural and urban India. In practical terms, this means a farmer could take a photo of an English agriculture article and get a Hindi version, or a schoolteacher could use voice recognition to convert a story from speech to text in a local language. AI can also help preserve languages by creating digital archives of spoken stories or old texts, as India has started doing through projects like the Scheme for Protection and Preservation of Endangered Languages (SPPEL).

Another opportunity is the changing market. Indian users have shown they will engage much more when offered content in their language. For instance, 88% of Indian language internet users are more likely to respond to an ad in their own language than in English. Big companies are noticing this: Google added voice search for eight Indian languages, Microsoft lets email addresses use 15 different scripts, and Amazon India supports sellers in multiple local languages. Content platforms too have adapted. Many YouTube channels, Netflix shows, and news sites now offer Hindi, Telugu, Bengali and other language options. Even local startups build apps from the ground up in vernacular languages. This growth of local content creates a virtuous circle: as more media and services appear in a language, more people read in that language, which in turn drives more content. Education is another area of promise. If tech education is offered in local languages, more students can join India's tech workforce. As one edtech leader reports, with 69% of Indians in rural areas speaking regional languages, switching to vernacular instruction "can help [students] comprehend and learn complex technological knowledge". Initiatives by both government and private sector aim to create online courses and resources in many Indian languages. For example, a proposed national language portal could allow teachers anywhere to upload lessons in any Indian language. Such ideas suggest that in the future a child in a Gujarati family could take local language classes online even if they live in Tamil Nadu. This could help India tap its "untouched talent pool" in villages and make education more inclusive.

Mobile internet and voice technologies are also levelling the playing field. Many Indians who never learned to read or write in English can still use an app by tapping icons or speaking commands. Voice assistants and regional keyboards mean people can interact online using only their native language. Reports suggest that voice-based tools may bring the next 400 million Indians online, because people find talking easier than typing in a new script. In sum, technology can act as a bridge: even if someone doesn't know English, AI and voice can translate for them in real time, opening up the whole web in their language.

English and Vernacular: A Balanced Future:

English and Indian languages have different roles, and both have challenges and

opportunities ahead. On one hand, English acts as India's bridge to the global economy, science and technology. Speaking English can give Indians access to international education and jobs in IT, research, and business. On the other hand, English is often a barrier at home. If public services, banking apps, or educational materials are only in English, most people will be left out. The digital age could change this balance. For example, experts note that to break the dominance of English online, India must use AI to translate English content into Indian languages. This means an English news article or a research paper could be instantly understood by millions more. Similarly, when Indians create local content, AI translation can allow non-speakers to read or watch it. In this way, English and vernaculars can complement each other: English to connect globally, local languages to serve communities.

There is still a cultural tension. Some worry that pushing vernacular might slow down learning English or global business. Others see English as sidelining native tongues. A balanced view is that both are valuable. Children could learn basic English for wider communication, while using their mother tongue for learning complex subjects. Indeed, policies often encourage such balance: India's education policy suggests students learn multiple languages, including the regional language and English. Digital tools can make this easier – for instance, an English-medium class could be live-translated into Hindi via captioning. Overall, the long-term future likely involves multilingualism. By 2047, Indians may commonly use all three streams: their home language for culture and social life, English for science and the world market, and perhaps Hindi or another link language for national unity. The digital world can support this by providing more content and services in every language.

Conclusion:

The digital era presents both challenges and opportunities for Indian languages. On the one hand, technical hurdles (like unique scripts and low literacy) and social factors (like English-medium schooling) can marginalize vernaculars. On the other hand, technology offers tools (AI translation, voice interfaces, mobile connectivity) that can bring languages online like never before. India's government and private sector are already working to digitize languages and include them in education and administration. As one recent press release puts it, embedding linguistic diversity into digital infrastructure is "the backbone of inclusion". By India's centenary of independence in 2047, the hope is to see a "Viksit Bharat" (developed India) where no citizen is left out of the digital revolution because of language. Achieving this will require smart policies: for example, supporting vernacular education, investing in language technologies, and encouraging content in all tongues. It will also require a shift in mindset: valuing Indian languages as assets, not obstacles.

With the right focus, India can turn its linguistic diversity into a digital strength. As Arun Prakash notes, integrating vernacular languages in technology education today can empower millions and shape India's economy by 2047.

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Mathematical Foundations of Artificial Intelligence for Intelligent Decision-Support Systems

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Abstract:

This paper provides a rigorous mathematical analysis of artificial intelligence foundations for decision-support systems in economic, administrative, and technological domains. It argues that reliability and interpretability depend on mathematical rigor rather than heuristic approaches. The study first establishes AI's theoretical foundations through three pillars: linear algebra for formalizing data representation and feature extraction; probability theory for quantifying uncertainty and risk; and statistical learning theory for bounding generalization error and ensuring model reliability.

Next, the paper examines optimization theory as the crucial link between mathematical models and learning processes. Decision-support algorithms are formulated as optimization problems incorporating loss functions, regularization, and feasibility constraints. The analysis covers both convex and non-convex optimization techniques, gradient-based methods, and convergence properties to explain algorithmic behaviour and stability. Finally, the framework demonstrates how these mathematical structures enable intelligent decision-making by treating decisions as optimization-driven inference problems. This approach yields risk-aware, consistent, and interpretable outcomes. The paper concludes that mathematically grounded AI is essential for developing reliable, robust, and scalable decision-support systems, moving beyond black-box implementations toward theoretically sound solutions that govern increasingly complex decision-making processes across multiple domains.

Keywords: Artificial Intelligence; Mathematical Modelling; Optimization Theory; Statistical Learning Theory; Decision-Support Systems; Probabilistic Inference.

Introduction:

Artificial Intelligence has emerged as a fundamental computational paradigm for addressing complex decision-making challenges in environments marked by uncertainty, high dimensionality, and conflicting objectives. Intelligent Decision-Support Systems (IDSS) utilize algorithmic models to assist or automate decisions through pattern extraction, outcome prediction, and action optimization. However, the reliability and trustworthiness of these systems fundamentally depend on the mathematical principles governing their design, learning mechanisms, and inferential validity. This section establishes the necessity for mathematical rigor in AI-based decision support, critiques heuristic methodologies, and articulates the study's objectives and scope.

Mathematical Rigor in AI-Based Decision Support:

Decision-support systems inherently impact outcomes with significant economic, administrative, and strategic implications. Such contexts demand decisions that are consistent, explainable, and robust against uncertainty properties achievable only through rigorous mathematical formulations. Mathematical foundations ensure decision-making processes

rest on formal structures including vector spaces, probability measures, optimization theory, and statistical inference, rather than ad hoc rules or empirical heuristics.

Mathematically, intelligence in decision support represents the capacity to map information to actions via well-defined functions that optimize specific objectives under constraints. Linear algebra provides geometric representation of information, probability theory quantifies uncertainty and risk, while optimization theory formalizes rational choice. Without these foundations, AI systems become opaque mechanisms whose behaviour defies analytical understanding or systematic improvement. Mathematical rigor further enables verifiability and generalization, allowing designers to reason about convergence, stability, error bounds, and sensitivity to perturbations indispensable guarantees in environments where errors propagate or amplify.

Limitations of Heuristic and Black-Box Models:

Contemporary AI systems often prioritize empirical performance through heuristic design choices or complex black-box models over theoretical transparency. While achieving high predictive accuracy, these models lack interpretable structure, complicating explanation, and justification of decisions a critical challenge where accountability matters.

Heuristic models typically provide no formal guarantees regarding convergence, optimality, or robustness, with behaviour varying unpredictably across data distributions, noise levels, or parameter initializations. Black-box models obscure mathematical relationships between inputs and outputs, preventing analytical assessment of decision boundaries, uncertainty propagation, or risk sensitivity. The absence of explicit objective functions, constraints, or probabilistic assumptions undermines decision quality evaluation, limiting applicability in contexts requiring consistency, reproducibility, and formal validation.

Study Objectives and Scope:

This study presents a systematic mathematical framework for understanding AI as a decision-support mechanism, emphasizing foundational mathematical structures rather than specific applications or empirical cases. The scope encompasses: formalizing decision-support systems through mathematical definitions and optimization principles; analysing linear algebra's role in data representation and decision boundary construction; employing probability theory and statistical learning for uncertainty modelling; interpreting machine learning algorithms via optimization and regularization frameworks; and examining stability, robustness, and interpretability mathematically.

The paper deliberately excludes domain-specific implementations, ethical discussions, and historical narratives, maintaining strict focus on theoretical and algorithmic foundations relevant to interdisciplinary mathematical and AI research communities. The subsequent sections systematically develop these mathematical foundations, progressing from formal definitions through linear algebra, probability theory, optimization theory, algorithmic interpretation, and culminating in a unified framework for mathematically grounded intelligent decision support.

Intelligent Decision-Support Systems: A Mathematical Perspective:

Intelligent Decision-Support Systems can be rigorously analysed by conceptualizing decision-making as a mathematical process transforming information into optimal actions. This section establishes formal definitions, frames decision-making as optimization, distinguishes deterministic and probabilistic frameworks, and

emphasizes mathematical abstraction's role in intelligent systems.

Formal Definition of Decision-Support Systems:

A decision-support system is formally defined as a tuple D = (X, A, M, C), where X represents the information or data space, A denotes the set of feasible actions or decisions, M is a mathematical model mapping information to decisions, and C is a criterion function evaluating decision quality. Intelligence emerges from the system's capacity to select actions optimizing the criterion function under given constraints. AI-based decision-support systems extend this framework by enabling M to be learned from data through mathematical optimization and statistical inference rather than explicit programming, fundamentally distinguishing adaptive intelligent systems from static rule-based approaches.

Decision-Making as Mathematical Optimization:

Decision-making fundamentally constitutes an optimization problem expressed as

$$\min_{a \in A} J(a, x), \text{ where } x \in X$$

denotes observed information and J represents an objective function capturing cost, risk, or loss. Constraints on resources, feasibility, or policy requirements define the admissible decision set. This formulation unifies diverse decision-support tasks within a single mathematical framework, where learning algorithms become procedures for approximating or minimizing objective functions, and decision rules correspond to optimal solutions under specified assumptions. Optimization theory thus provides the mathematical bridge connecting data-driven learning to rational decision-making.

Deterministic versus Probabilistic Frameworks:

Decision-support systems operate under deterministic or probabilistic assumptions. Deterministic frameworks treat inputs and outcomes as fixed quantities, yielding precise decision rules appropriate when uncertainty is negligible or ignorable. Conversely, probabilistic frameworks explicitly model uncertainty using random variables and probability distributions, basing decisions on expected utility, risk measures, or posterior inference. Probabilistic decision-making proves particularly crucial in real-world environments characterized by noisy, incomplete, or stochastic data, where mathematical tools like Bayesian inference and expectation operators play central roles in managing uncertainty.

Mathematical Abstraction in Intelligent Systems:

Mathematical abstraction enables representation of complex decision processes in compact, analysable forms. By abstracting data as vectors, uncertainty as probability measures, and decisions as optimization variables, intelligent systems become amenable to theoretical analysis. Abstraction facilitates cross-domain generalization, enabling identical mathematical principles to govern diverse decision-support problems. This abstraction transforms AI from a disparate collection of algorithms into a coherent mathematical discipline capable of producing reliable, interpretable, and scalable decision-support systems. The mathematical perspective thus provides the foundational language for understanding, designing, and validating intelligent decision-making systems across applications.

Linear Algebraic Foundations of Artificial Intelligence:

Linear algebra constitutes the structural backbone of artificial intelligence, providing precise mathematical language for representing data, transforming information, and constructing decision rules. In intelligent decision-support systems, data, models, and decisions naturally

assume vector and matrix forms, enabling geometric interpretation and analytical tractability. This section examines vector spaces, matrix transformations, spectral properties, and linear models in AI-driven decision-making.

Vector Spaces and Feature Representation:

Data in artificial intelligence is mathematically represented as elements of a vector space $X \subseteq \mathbb{R}^n$, where each data point is encoded as a feature vector

$$x = (x_1, x_2, ..., x_n).$$

This representation embeds complex objects or observations into structured mathematical spaces with well-defined algebraic operations. Feature representation determines data space geometry, influencing distances, angles, and linear separability—properties directly affecting decision boundaries and optimization behaviour. From a decision-support perspective, feature vectors encode information relevant to decision criteria, while vector space structure enables similarity measurement and aggregation. The feature space choice constitutes a critical modelling decision, implicitly defining assumptions under which learning and inference operate.

Matrix Transformations in Data Modelling:

Matrices function as linear operators transforming data between representations. A matrix $A \in \mathbb{R}^{m \times n}$ enables the transformation

$y = Ax$, mapping vectors from $\mathbb{R}^n$ to $\mathbb{R}^m$.

Such transformations prove central to data preprocessing, feature extraction, and model parameterization. In intelligent systems, matrix transformations enable feature scaling and normalization, data projection into different dimensional spaces, and linear feature combinations for decision modelling. These transformations preserve linear structure while modifying geometric relationships, allowing models to emphasize informative data components. In decision-support contexts,

matrices encode decision rules that weight, combine, or suppress information in controlled, analysable manners.

Eigenvalues, Eigenvectors, and Dimensionality Reduction:

Eigenvalues and eigenvectors characterize intrinsic structures of linear transformations. For square matrix A, an eigenvector $v \neq 0$ satisfies

$$Av = \lambda v,$$

where λ represents the corresponding eigenvalue. Eigenvectors define invariant transformation directions, while eigenvalues quantify their relative importance. Dimensionality reduction techniques exploit spectral properties to identify dominant data directions. Projecting high-dimensional data onto subspaces spanned by leading eigenvectors reduces complexity while preserving essential information—particularly valuable in decision-support systems where high dimensionality obscures decision logic and increases computational costs. Mathematically, dimensionality reduction enhances stability and interpretability by eliminating redundant or noisy dimensions, yielding more robust decisions based on principal data structure rather than incidental variations.

Linear Models and Decision Boundaries:

Linear models represent the simplest yet most analytically tractable decision-support algorithms. A linear decision function

$$f(x) = w^T x + b, \text{ where } w \in \mathbb{R}^n$$

are a weight vector and $b \in \mathbb{R}$ is a bias term, defines hyperplanes partitioning feature space into decision regions. Decision boundary geometry is entirely determined by linear algebraic properties of the weight vector. Despite simplicity, linear models offer significant advantages in interpretability, computational efficiency, and theoretical analysis, serving both as standalone decision mechanisms and foundational components of complex

architectures, particularly suitable for applications requiring transparent, explainable decisions.

Probability Theory and Statistical Foundations:

Probability theory provides the rigorous framework for reasoning under uncertainty in intelligent decision-support systems. While linear algebra establishes structural foundations, probability theory enables systems to operate with incomplete, noisy, or stochastic information. This section examines random variables, Bayesian inference, statistical learning theory, and risk quantification as essential mathematical tools for uncertainty-aware decision-making.

Random Variables and Uncertainty Modelling:

Uncertainty in intelligent systems is mathematically represented using random variables. A random variable X maps outcomes from a sample space Ω to a measurable space, enabling uncertainty quantification through probability distributions. In decision-support systems, observations, outcomes, and environmental factors are modelled as random variables, allowing systems to distinguish between noise-induced variability and structural variability. Probability distributions encode beliefs about possible world states, forming the foundation for rational decision-making under uncertainty. This mathematical formalization transforms vague notions of uncertainty into precise, analysable constructs amenable to systematic reasoning and optimization.

Bayesian Inference for Decision Support:

Bayesian inference offers a principled methodology for updating beliefs given new information. Given a prior distribution $P(\theta)$ over model parameters θ and observed data D, Bayes' theorem yields the posterior distribution

$$P(\theta|D) = P(D|\theta)P(\theta)/P(D).$$

In decision-support systems, Bayesian inference enables decisions based on posterior expectations or risk measures rather than point estimates, enhancing robustness and enabling explicit uncertainty quantification. Mathematically, Bayesian frameworks integrate probability theory with optimization by selecting actions minimizing expected loss under the posterior distribution. This synthesis makes Bayesian methods particularly well-suited for intelligent decision-support tasks requiring principled uncertainty propagation and belief updating.

Statistical Learning Theory and Generalization:

Statistical learning theory provides mathematical foundations for understanding model performance on unseen instances after training on finite data. Central to this theory is generalization error, defined as the expected discrepancy between predicted and true outcomes. Learning algorithms minimize empirical risk while controlling model complexity to avoid overfitting. Mathematical bounds on generalization error relate sample size, hypothesis space complexity, and confidence levels—critical results for decision-support systems where unreliable generalization yields systematically poor decisions. From a mathematical standpoint, statistical learning theory ensures data-driven decisions reflect stable underlying relationships rather than training data artifacts, providing formal guarantees about model reliability.

Risk, Variance, and Confidence in Decision Outcomes:

Decision-support systems must evaluate both expected outcomes and associated risks. Risk measures quantify decision variability and uncertainty through variance or higher-order moments of probability distributions. High-variance decisions may yield favourable average outcomes while posing unacceptable risks in

critical applications. Mathematical risk analysis allows decision-support systems to balance expected performance against stability and reliability. Confidence measures enable systems to communicate certainty degrees associated with decisions. Together, risk and confidence form essential components of mathematically sound decision-support frameworks, ensuring systems not only optimize expected performance but also manage uncertainty and variability appropriately for application-specific requirements.

Optimization Theory in Intelligent Decision-Making:

Optimization theory provides the mathematical machinery transforming information and models into actionable decisions. In AI-based decision-support systems, learning, inference, and decision selection fundamentally constitute optimization-driven processes. This section formalizes optimization problems, distinguishes convex and non-convex structures, examines gradient-based methods, and discusses multi-objective decision trade-offs.

Mathematical Formulation of Optimization Problems:

Intelligent decision-making is foundationally expressed as an optimization problem: $\min_{x \in F} f(x)$, where x represents decision variables, $f: \mathbb{R}^n \to \mathbb{R}$ is an objective function, and F is a feasible region defined by constraints. In decision-support systems, objective functions encode criteria such as cost, risk, or loss, while constraints represent resource limitations, policy requirements, or physical feasibility. This formulation unifies diverse AI algorithms by interpreting them as procedures seeking optimal solutions within mathematically defined spaces. The mathematical clarity of optimization formulations enables rigorous analysis of solution existence, uniqueness, and

sensitivity—all critical for reliable decision-making.

Convex and Non-Convex Optimization in AI:

A central optimization theory distinction separates convex and non-convex problems. An optimization problem is convex if the objective function is convex and the feasible region forms a convex set. Convex problems possess desirable mathematical properties, including the guarantee that any local minimum is also a global minimum. Many classical decision-support models and linear learning algorithms fall into the convex optimization category, allowing efficient and reliable solution methods. Conversely, modern AI systems often involve non-convex objective functions due to complex model structures or variable interactions. Non-convex optimization introduces multiple local minima, saddle points, and complex landscapes. While mathematically challenging, such problems enable expressive models capable of capturing intricate patterns. Understanding non-convex optimization landscape geometry proves essential for analysing AI-based decision-support system behaviour and reliability.

Gradient-Based Methods and Convergence Analysis:

Gradient-based methods constitute the primary computational approach for solving optimization problems in artificial intelligence. Given a differentiable objective function f(x), iterative methods update decision variables according to

$$x(k+1) = x(k) - \alpha(k)\nabla f(x(k)),$$

where $\alpha(k)$ denotes a step size or learning rate. Convergence behaviour depends on objective function properties, including smoothness and convexity. In convex settings, gradient-based methods admit strong theoretical guarantees regarding convergence rates and solution quality. In non-convex contexts, convergence analysis focuses on critical points

and stability rather than global optimality. From a decision-support perspective, convergence properties are crucial, as incomplete, or unstable optimization may yield inconsistent or unreliable decisions. Mathematical analysis of optimization algorithms thus plays a key role in ensuring decision robustness.

Multi-Objective Optimization for Decision Trade-Offs:

Real-world decision-support systems frequently involve multiple competing objectives, such as accuracy, cost, and risk. Multi-objective optimization formalizes such scenarios by considering vector-valued objective functions:

$$\min(x \in F) \ (f_1(x), f_2(x), ..., f(k)(x)).$$

Rather than yielding a single optimal solution, multi-objective problems produce a set of Pareto-optimal solutions representing different trade-offs. Mathematical analysis of these trade-offs enables decision-makers to select solutions best aligning with contextual priorities. In intelligent decision-support systems, multi-objective optimization provides a principled framework for balancing performance criteria, ensuring decisions reflect structured trade-offs rather than arbitrary compromises.

Mathematical Foundations of Machine Learning Algorithms:

Machine learning algorithms can be rigorously interpreted as mathematical optimization procedures operating over structured hypothesis spaces. This section examines loss functions, regularization, constraints, and performance metrics from a mathematical standpoint, emphasizing their role in decision-support systems.

Loss Functions and Objective Function Design:

A loss function quantifies the discrepancy between predicted and actual outcomes. Formally, let y denote the true outcome and ŷ the model

prediction. A loss function $L(y, \hat{y})$ assigns a non-negative cost to prediction errors. The learning objective is typically defined as minimizing expected or empirical loss over a dataset. Loss function choice directly influences optimization problem geometry and resulting decision behaviour. Well-designed loss functions align mathematical optimization with meaningful decision criteria. In decision-support systems, loss functions encode preferences, penalties, and tolerances, making them central to AI-driven decision rationality. The mathematical formulation of loss functions provides a principled mechanism for translating domain-specific decision requirements into analytically tractable optimization objectives.

Regularization and Mathematical Control of Overfitting:

Regularization introduces additional terms into optimization objectives to control model complexity. A regularized optimization problem assumes the form

$$\min(x) \ f(x) + \lambda R(x),$$

where $R(x)$ is a regularization function and $\lambda > 0$ is a weighting parameter. From a mathematical perspective, regularization restricts the effective hypothesis space, improving stability and generalization. It can be interpreted as imposing prior structure or smoothness on solutions, thereby reducing noise sensitivity. In decision-support systems, regularization ensures decisions are based on robust patterns rather than spurious correlations, enhancing reliability and interpretability. Mathematically, regularization provides a formal mechanism for balancing model expressiveness against overfitting risk, yielding solutions that generalize beyond training data.

Optimization Constraints and Feasibility Regions:

Constraints define the set of admissible solutions for optimization problems. These

constraints may arise from physical limitations, logical conditions, or policy requirements. Mathematically, constraints partition the decision space into feasible and infeasible regions. Constrained optimization techniques ensure that learned models and decisions respect these limitations. Feasibility region geometry significantly influences solution properties and computational complexity. In intelligent decision-support systems, constraints encode essential domain knowledge, ensuring decisions remain valid and actionable within real-world contexts. The mathematical treatment of constraints transforms implicit domain requirements into explicit structural properties of the optimization problem, enabling systematic verification of decision feasibility.

Mathematical Interpretation of Model Performance Metrics:

Performance metrics provide quantitative measures for evaluating model quality and decision effectiveness. Metrics such as error rates, loss values, or confidence intervals can be analysed mathematically to assess consistency and reliability. From a mathematical standpoint, performance metrics are functions defined over model outputs and true outcomes. Their statistical properties, including bias and variance, offer insight into decision-support algorithm strengths and limitations. Rigorous interpretation of performance metrics enables informed model comparison and supports principled decision selection based on mathematical criteria rather than empirical intuition alone. Mathematical analysis of metrics ensures evaluation frameworks align with theoretical guarantees and decision-support objectives, providing formal foundations for model validation and selection.

Algorithmic Decision-Support Framework:

An AI-based decision-support system can be rigorously described as an algorithmic pipeline grounded in mathematical modelling, optimization, and inference. This section outlines structural components of such systems and analyses their stability, robustness, and interpretability from a mathematical perspective, followed by applications demonstrating how mathematical AI models support various decision contexts.

Mathematical Structure of AI-Based Decision Systems:

Mathematically, an intelligent decision-support system constitutes a composite mapping: $X \to \Phi \to H \to A$,

where X denotes the data space, Φ represents feature transformation, H is a hypothesis space, and A is the decision or action space. Decision rules emerge as solutions to optimization or inference problems defined over these spaces. The system's intelligence lies not in ad hoc procedures but in the mathematical coherence of its mappings and objective functions, establishing a formal framework connecting data to decisions through well-defined mathematical transformations.

Data Representation, Model Selection, and Optimization Pipeline:

The algorithmic pipeline consists of three mathematically linked stages: data representation, model selection, and optimization. Data is first embedded into a structured space preserving relevant relationships. A model class is then selected based on expressiveness and analytical tractability. Optimization methods identify parameter values minimizing loss or risk functions. Each stage is governed by mathematical criteria ensuring consistency between representation, learning, and decision objectives, creating a coherent end-to-end framework for transforming raw information into principled decisions.

Stability, Robustness, and Sensitivity Analysis:

Stability refers to the system's ability to produce consistent decisions under small input data perturbations. Robustness extends this notion to uncertainty and noise. Sensitivity analysis examines how parameter or input variations affect decision outcomes. Mathematically, these properties are analysed using continuity, Lipschitz bounds, and perturbation theory. In decision-support systems, stability and robustness are essential for ensuring decisions are not overly sensitive to minor fluctuations or modelling assumptions, providing formal guarantees about system reliability under varying conditions.

Interpretability from a Mathematical Viewpoint:

Interpretability represents the degree to which a decision rule admits analytical explanation. Models with explicit objective functions, constraints, and linear or convex structure are inherently more interpretable. From a mathematical perspective, interpretability arises when relationships between inputs, parameters, and outputs can be expressed in closed or analysable form. Such clarity enhances trust and enables formal validation of decision logic, distinguishing mathematically grounded systems from opaque black-box approaches.

Applications of Mathematical AI Models in Decision Support:

Mathematical AI models address diverse decision-support challenges across multiple domains. Resource allocation and scheduling are formulated as constrained optimization problems, enabling efficient allocation under capacity and policy constraints while supporting systematic trade-offs between competing demands. Economic and policy decision modelling employs probabilistic inference, optimization, and equilibrium concepts to formalize preferences, constraints, and risks, providing structured recommendations grounded in mathematical reasoning for decisions involving uncertainty and long-term consequences. Risk assessment and predictive systems utilize probabilistic models to quantify uncertainty through distributions, expectations, and variance measures, with optimization-driven inference balancing expected outcomes against acceptable risk levels. Performance evaluation relies on mathematically defined metrics—loss functions, error bounds, and confidence measures—enabling objective comparison of alternative strategies based on formal properties rather than subjective judgment, thereby reinforcing the reliability and validity of AI-driven decision-support systems.

Challenges and Mathematical Limitations:
Computational Complexity and Scalability:

Many optimization and inference problems in AI are computationally intensive. High-dimensional feature spaces, large datasets, and non-convex objective functions can render exact solutions intractable. While convex problems often admit polynomial-time algorithms, non-convex and combinatorial formulations can lead to NP-hard complexity. Scalability is a major mathematical challenge: algorithms must balance solution quality with tractable computation. Approximation methods, relaxations, and heuristics are often employed, but they introduce trade-offs between mathematical guarantees and practical feasibility.

Mathematical Trade-Offs Between Accuracy and Interpretability:

There exists an inherent tension between model expressiveness and interpretability. Highly flexible models can achieve superior empirical accuracy but lack analytical transparency. Conversely, linear, or convex models provide clear mathematical insight but may underfit complex phenomena. Mathematically, this trade-off is expressed in the structure of objective

functions, constraints, and hypothesis spaces. Decision-support systems must carefully balance the need for reliable, explainable outcomes against the desire for optimal predictive performance.

Data Uncertainty and Model Assumptions:

All AI models rely on assumptions about data distributions, independence, and noise structure. Violation of these assumptions can lead to model misspecification and suboptimal decisions. Probabilistic frameworks mitigate some of these issues but cannot eliminate uncertainty entirely. Mathematical limitations also arise from sparse, incomplete, or biased data, which reduce the confidence and generalization guarantees of the learned models. Understanding the sensitivity of decisions to data uncertainty is therefore essential in rigorous AI system design.

Open Mathematical Problems in AI Decision Systems:

Several fundamental questions remain open, including:

- Characterization of global optima in high-dimensional non-convex landscapes,
- Quantification of uncertainty propagation in complex multi-stage decision systems,
- Scalable algorithms that preserve theoretical guarantees in large-scale settings.

Addressing these problems requires continued research at the intersection of optimization, probability, and learning theory.

Future Directions:

The following directions highlight promising avenues for research.

Advancing Mathematical Transparency in AI:

Improved formalization of AI systems will allow more precise reasoning about their behaviour. Transparent mathematical frameworks can provide provable guarantees regarding convergence, stability, and decision quality,

reducing reliance on empirical heuristics. Techniques such as symbolic representations, structured hypothesis spaces, and analytic sensitivity analysis contribute to this objective.

Hybrid Models: Optimization + Probabilistic Reasoning:

Future systems are likely to integrate deterministic optimization with probabilistic inference. Such hybrid models combine the strengths of both approaches: rigorous control over constraints and objectives, alongside principled handling of uncertainty. Mathematically, this requires unified formulations capable of jointly optimizing expected outcomes under stochastic constraints.

Towards Explainable and Verifiable Decision-Support Systems:

Explainability and verifiability remain key priorities. Mathematically interpretable models allow explicit mapping from inputs to decisions, enabling formal verification and auditability. Future work will focus on developing decision-support frameworks that are both analytically tractable and computationally practical, ensuring that intelligent systems produce trustworthy outcomes.

Conclusion:

This paper presented a rigorous mathematical foundation for AI-based decision-support systems, establishing core contributions including linear algebraic representations for data and decision modelling, probabilistic frameworks for uncertainty quantification, optimization-based learning and inference pipelines, and formal analysis of stability, robustness, and interpretability. These structures collectively provide a coherent framework linking mathematical theory to practical decision-making.

Mathematical rigor ensures intelligent systems produce consistent, explainable, and robust decisions. By grounding AI in formal

structures, decision-support systems quantify risk, verify constraints, and generalize reliably across diverse contexts. This approach demonstrates that AI decision credibility derives not from complexity or empirical performance alone, but from sound mathematical principles underlying system design and operation.

Intelligent decision-support systems represent the convergence of mathematics, optimization, and computational reasoning. Their design and deployment benefit from a mathematics-first approach enabling both theoretical guarantees and practical applicability. Future research addressing computational, probabilistic, and interpretability challenges will further enhance AI-driven decision support reliability, ensuring such systems remain analytically transparent, trustworthy, and effective in complex environments. The mathematical perspective transforms AI from a collection of algorithms into a coherent discipline capable of producing reliable, interpretable, and scalable decision-support systems grounded in rigorous theoretical foundations.

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India's Economic Growth and Its Impact on the Global Economy: A Review

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Abstract:

In recent decades, India, the world's largest democracy, has undergone substantial economic transformation. India's economy changed from being dependent on agriculture to becoming one of the top countries with the fastest economic development in the world following the introduction of liberalization policies in the early 1990s. The study examines how India's economy has developed over time, analyses the key sectors that have contributed to its expansion, and considers the impact of this development on the global economy. It considers India's expanding impact on global investment flows, trade, digital innovation, and geopolitics. The paper also identifies challenges and potential future developments as India seeks to become a major player in the global economy.

Introduction:

India's economic expansion in the twenty-first century has emerged as a significant force in the global economy. Since independence, the Indian economy has transitioned from an agrarian and inward-looking system to one of the fastest-growing major economies, driven by economic liberalization, technological progress, and deeper global integration. The reforms initiated in 1991 marked a critical turning point by promoting market-oriented policies, encouraging private sector participation, and opening the economy to international trade and investment. In recent years, sustained GDP growth has been supported by strong domestic demand, expanding manufacturing and services sectors, and increased infrastructure investment. India's growing participation in global value chains, rising share in global output, and

prominence in services exports—particularly in information technology and digital services—highlight its increasing economic relevance. Furthermore, India's engagement in global economic governance forums such as the G20 reflects its expanding role in shaping international economic policies. Despite challenges related to employment, inequality, and environmental sustainability, India's growth trajectory holds important implications for global economic stability and future growth dynamics.

Objectives of the Study:
The primary objectives of this research are:

1. To assess the drivers and path of India's economic growth.
2. To analyse India's role in the global economy.
3. To evaluate the impact of India's

growth on worldwide trade, investment, and economic governance.

4. To identify key challenges and future prospects.

Historical Economic Growth in India:

India's economic growth has gone through several stages, influenced by global economic conditions, policy decisions, and historical events. The Indian economy has changed significantly since gaining independence in 1947, going from being mostly an agrarian and inward-looking system to one that is diversified, market-oriented, and globally linked.

India used a socialist-inspired planned economy throughout the **post-independence era (1947–1990).** Through public sector businesses, central planning, and stringent regulations known as the "License Raj," the government dominated economic activity. Import-substitution strategies were used to prioritize industrial development to lessen reliance on imported commodities. This strategy contributed to the expansion of infrastructure and the establishment of a fundamental industrial foundation, but economic development remained slow, averaging only 3–4 percent each year. This time frame is frequently referred to as the "Hindu rate of growth," which reflects the modest growth in per capita income, minimal productivity improvements, and moderate expansion. Economic dynamism was hampered by reliance on agriculture, inefficiency in public businesses, and limited involvement from the private sector.

A key turning point in India's economic history was the **agrarian revolution in the 1960s and 1970s.** The use of fertilizers, better irrigation, and the introduction of high-yield variety seeds greatly enhanced food grain production, lowering reliance on food imports

and enhancing food security. The Green Revolution was vital in stabilizing the rural economy and promoting general economic development, despite being regionally focused and not immediately accelerating industrial expansion.

The **economic liberalization measures of 1991,** which were implemented in reaction to a serious balance of payments crisis, marked a significant change. India's economy changed from being closed and regulated to being more open and focused on the market because to these reforms. Industrial deregulation, lower import taxes, privatization of public sector businesses, promotion of foreign direct investment, and changes to trade and banking regulations were some of the important initiatives. A persistent acceleration of economic growth resulted from the liberalization era's substantial improvements in productivity, efficiency, and competitiveness across industries.

India's economy grew rapidly throughout the **post-liberalization era (1991–2008),** frequently surpassing 6% annually. Information technology, telecommunications, banking, and business services have become important growth drivers. India's standing in the world economy was reinforced by growing exports, more foreign investment, and better macroeconomic stability. Domestic consumption increased because of a growing middle class and a decrease in poverty.

India showed some resilience in the wake of the **2008 global financial crisis** thanks to a diverse economy and domestic demand. Fiscal stimulus and policy changes helped maintain economic momentum even while growth momentarily slowed. Long-term economic prospects were strengthened in the post-2010 period by additional structural reforms such the implementation of the Goods and Services Tax (GST), bankruptcy and insolvency reforms,

digitization projects, and higher infrastructure expenditure.

All things considered, India's past economic expansion shows a slow but profound change. India's economic journey, which began with modest growth under a planned economy and ended with rapid expansion in a liberalized and globally integrated system, emphasizes the crucial importance that structural change, policy reforms, and flexibility play in determining long-term economic progress.

Key Drivers of Economic Growth in India:

India's sustained economic growth in recent decades has been driven by a combination of demographic, structural, policy, and technological factors. A favourable demographic profile, with a large and young working-age population, has supported labour supply, productivity, and domestic demand, provided it is matched with adequate skills and employment. Expanding domestic consumption, fuelled by rising incomes, urbanization, and a growing middle class, has acted as a key stabilizing force during global slowdowns. Structural and policy reforms—beginning with the 1991 liberalization and reinforced by initiatives such as the GST, Insolvency and Bankruptcy Code, labour reforms, and production-linked incentive schemes—have improved efficiency and competitiveness. The rapid expansion of the services sector, particularly information technology and digital services, alongside rising infrastructure investment, foreign direct investment, and digitalization, has further strengthened India's long-term growth potential.

India's Contribution to the Global Economy:

India's sustained economic growth has elevated its role from a large emerging market to a major driver of global economic expansion. Real GDP growth is projected to remain robust at around 6.5–6.7% during 2024–25 and 2025–26, outpacing most major economies and reaffirming India's position as the world's fastest-growing large economy (IMF). With nominal GDP doubling to approximately USD 4.2–4.3 trillion over the past decade, India is on track to become the fourth-largest global economy. This expansion has increased India's contribution to global output growth, supporting global aggregate demand amid sluggish growth in advanced economies. Deeper integration into global trade and investment flows— particularly through services, pharmaceuticals, and manufacturing—has strengthened global supply chains and capital linkages. The services sector, led by information technology and business services, continues to generate productivity spillovers worldwide. Additionally, record remittance inflows of about USD 129 billion in 2024 highlight India's human capital contribution and reinforce global financial interconnectedness. India's growing economic weight has also enhanced its influence in global governance institutions such as the G20, IMF, and World Bank.

Impact on Global Markets and Institutions:

India's sustained economic expansion has significantly increased its influence in global financial markets and economic governance. The growing size of the Indian economy has raised its weight in global equity and bond markets, with Indian securities occupying a larger share in emerging market indices, attracting sustained portfolio investment and improving market liquidity. India has also emerged as a leading destination for foreign direct investment among developing economies, supported by stable macroeconomic fundamentals and strong growth prospects. A diversified financial system and the presence of domestic institutional investors have enhanced resilience, enabling India to absorb

global shocks and contribute to stability in emerging financial markets.

India's expanding role is further reflected in its leadership in global IPO activity, cross-border corporate expansion, and the development of international financial service hubs and digital payment linkages, reinforcing its contribution to global capital formation and financial infrastructure. In parallel, India plays an active role in multilateral institutions such as the IMF, World Bank, WTO, G20, and BRICS, where it advocates inclusive growth, development finance, and fair global governance, strengthening the voice of the Global South.

This growing global relevance is underpinned by a credible policy framework emphasizing inflation targeting, fiscal consolidation, structural and industrial reforms, and calibrated trade integration. Strategic economic partnerships and sustained reform momentum have further strengthened India's systemic importance within the global economic and institutional landscape.

Challenges and Risks:

IMF and World Bank assessments identify several risks that may moderate India's global economic impact despite strong growth fundamentals. Increased integration with global markets heightens exposure to external shocks, including global financial volatility, geopolitical tensions, and commodity price fluctuations. Capital flow reversals, particularly during global monetary tightening, pose risks to financial stability. Structural constraints— such as infrastructure gaps, skill mismatches, and uneven regional development—may limit competitiveness in global value chains. Additionally, fiscal consolidation pressures and external balance management remain critical during global slowdowns. Addressing these risks through sustained reforms and policy coordination is essential to preserving India's macroeconomic stability and growing systemic importance in the global economy.

Global Economic Volatility: India's increasing integration with global markets exposes it to external shocks such as global recessions, geopolitical tensions, commodity price volatility, and financial market instability.

Trade Protectionism and Geopolitical Risks: Rising protectionist tendencies, trade disputes, and geopolitical realignments may constrain India's export growth and disrupt participation in global value chains.

Capital Flow Volatility: Dependence on foreign portfolio investment increases vulnerability to sudden capital outflows triggered by global monetary tightening, interest rate changes, or shifts in investor sentiment.

Structural and Implementation Constraints: Despite reforms, challenges such as infrastructure gaps, regulatory complexity, skill mismatches, and regional disparities may limit India's ability to fully capitalize on global opportunities.

Manufacturing Competitiveness Risks: High logistics costs, energy transition pressures, and competition from other emerging economies pose risks to India's manufacturing-led export ambitions.

Fiscal and External Balance Pressures: Sustaining growth while managing fiscal deficits and current account imbalances remains a key challenge, particularly during periods of global slowdown.

Institutional and Governance Challenges: Effective coordination between domestic policies and international commitments is essential; inconsistencies may weaken India's credibility in global economic institutions.

Technological and Digital Divide Risks: While digital transformation is a strength, uneven access and cybersecurity risks could undermine inclusive growth and global competitiveness.

Future Prospects and Policy:

Recommendations:

A. Future Prospects:

- **Sustained High Growth Potential:** Demographic advantages, expanding domestic demand, and continued urbanization position India as a long-term contributor to global economic growth.

- **Deeper Global Value Chain Integration**: Ongoing diversification of global supply chains creates opportunities for India to expand its role in manufacturing, logistics, and intermediate goods trade.

- **Services and Digital Economy Leadership**: Growth in IT, digital services, fintech, and knowledge-based sectors will further strengthen India's global competitiveness and export earnings.

- **Rising Global Institutional Influence**: India's increasing economic weight enhances its role in shaping global economic governance within institutions such as the IMF, World Bank, G20, and WTO.

- **Green Growth and Energy Transition**: Investments in renewable energy and climate-resilient infrastructure position India as a key participant in global sustainability and climate finance initiatives.

B. Policy Recommendations:

- **Maintain Macroeconomic Stability**: Continue prudent fiscal management, inflation targeting, and financial sector oversight to sustain investor confidence and global credibility.

- **Strengthen Manufacturing Competitiveness**: Improve logistics efficiency, reduce transaction costs, and support technology adoption to enhance participation in global value chains.

- **Enhance Trade and Foreign Economic Policy:** Pursue balanced trade agreements and strategic partnerships that support exports, technology transfer, and supply-chain resilience.

- **Promote Human Capital Development:** Align education and skill development policies with global labor market requirements to fully leverage India's demographic dividend.

- **Deepen Financial Markets:** Expand bond markets, improve financial inclusion, and manage capital flow volatility to strengthen integration with global finance.

- **Accelerate Digital and Green Reforms:** Scale digital public infrastructure and green finance mechanisms to support inclusive, sustainable growth.

- **Strengthen Institutional Capacity**: Improve policy coordination and regulatory effectiveness to align domestic reforms with international economic commitments.

Interpretation:

India's transition from a large emerging market to an increasingly systemically relevant economy reflects its sustained growth, supported by macroeconomic stability, favourable demographics, and structural reforms. This growth has positioned India as an important contributor to global output, particularly during periods of subdued growth in advanced economies (IMF, 2024; World Bank, 2024). Deeper integration into global trade, services, and financial markets has strengthened international production networks and capital flows. India's services-led growth—especially in information technology and knowledge-intensive sectors—

has generated global productivity spillovers, while manufacturing initiatives have enhanced participation in global value chains (WTO, 2023; UNCTAD, 2024). Rising foreign investment, expanding capital markets, and sustained remittance inflows further reinforce India's global economic linkages. Moreover, India's active engagement in multilateral institutions such as the IMF, World Bank, WTO, G20, and BRICS has strengthened its role in global economic governance, despite ongoing risks related to global financial volatility and structural constraints (IMF, 2024).

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Local Self Government Election (Municipals Councils) in Maharashtra 2026- a Path of Democracy

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Abstract:

India's democracy began with independence in 1947, formalized by its 1950 Constitution, establishing a sovereign, socialist, secular, democratic republic with universal adult suffrage, making it the world's largest democracy, sustained despite challenges like poverty and conflict, evolving from ancient self-governing councils (Panchayats) and integrating princely states, while navigating complex social divisions and periods like the 21-month Emergency (1975-77) to become a robust multi-party system.

Introduction:

Key Stages & Foundations:

1. **Ancient Roots:** Grassroots governance existed through "Panchayats" (councils of elders) in ancient India, with evidence from the Indus Valley Civilization.
2. **Colonial Transition:** The British Raj gradually introduced legislative bodies, but true democracy emerged post-independence.
3. **Independence & Constitution (1947-1950):**
   - India gained independence in 1947.
   - The Constitution, adopted in 1950, established a parliamentary democracy with a strong federal structure, secular principles, and fundamental rights.
   - It granted universal adult suffrage, a radical step for a newly independent nation.
4. **First Elections (1951-52):** The first general elections solidified the transition, creating a shared national purpose despite immense diversity, poverty, and partition violence.

Characteristics & Challenges:

- **World's Largest Democracy:** India conducts regular, free, and fair elections with a vibrant multi-party system.
- **Diversity:** Sustaining democracy amidst deep divisions of caste, religion, language, and poverty has been a defining feature.
- **Challenges:** Faced issues like casteism, corruption, terrorism, separatist movements, and territorial disputes.
- **Resilience:** Survived significant crises, notably the 21-month (1975-1977) when civil liberties were suspended.

Evolution:

- From its inception, India established democratic institutions and principles, evolving into a complex, dynamic system known for its resilience and commitment to citizen participation.

Local Bodies Statistics at a Glance:

Sr. No.	Division	Area in Sq. Km.	Population	No. of Districts	Mun Corporations	Municipal Councils	Nagar Panchayats	Zilla Parishads	Panchayat Samitis	Village Panchayats	Total
1	Konkan	30728	24883830	7	9	22	22	5	45	3014	3117
2	Nashik	57440	15736784	5	5	45	16	5	54	4972	5095
3	Pune	57275	19997778	5	6	50	25	5	57	5649	5791
4	Ch. Sambhajinagar	64813	15629248	8	5	49	26	8	76	6582	6746
5	Amravati	46035	9948366	5	2	41	16	5	56	3910	4029
6	Nagpur	51286	10682621	6	2	41	42	6	63	3655	3807
Total			307577	96878627	36	29	247	147	34	351	27782	28585

Source: Election Commission of Maharashtra

Municipals Council's in Maharashtra at a Glance:

1	Dhule	Dhule Municipal Corporation	30/12/2023	12/2023
2	Ahilyanagar	Ahilyanagar Municipal Corporation	27/12/2023	12/2023
3	Jalgaon	Jalgaon Municipal Corporation	17/09/2023	09/2023
4	Sangli	Sangli Miraj Kupwad Municipal Corporation	19/08/2023	08/2023
5	Nanded	Nanded Waghala Municipal Corporation	31/10/2022	10/2022
6	Thane	Mira-Bhayander Municipal Corporation	27/08/2022	08/2022
7	Raigarh	Panvel Municipal Corporation	09/07/2022	07/2022
8	Thane	Bhiwandi-Nizampur Municipal Corporation	08/06/2022	06/2022
9	Nashik	Malegaon Municipal Corporation	13/06/2022	06/2022
10	Latur	Latur Municipal Corporation		
11	Parbhani	Parbhani Municipal Corporation	15/05/2022	05/2022
12	Thane	Ulhasnagar Municipal Corporation	04/04/2022	04/2022
13	Chandrapur	Chandrapur Municipal Corporation	29/04/2022	04/2022
14	Nagpur	Nagpur Municipal Corporation	04/03/2022	03/2022
15	Akola	Akola Municipal Corporation	08/03/2022	03/2022
16	Pune	Pune Municipal Corporationg	14/03/2022	03/2022
17	Thane	Thane Municipal Corporation	05/03/2022	03/2022
18	Pune	Pimpri-Chinchwad Municipal Corporation	13/03/2022	03/2022
19	Nashik	Nashik Municipal Corporation	13/03/2022	03/2022
20	Solapur	Solapur Municipal Corporation		
21	Amravati	Amravati Municipal Corporation	08/03/2022	03/2022
22	Mumbai City	Brihan Mumbai Municipal Corporation	07/03/2022	03/2022
23	Thane	Kalyan-Dombivali Municipal Corporation	10/11/2020	11/2020
24	Kolhapur	Kolhapur Municipal Corporation	15/11/2020	11/2020
25	Palghar	Vasai- Virar Municipal Corporation	28/06/2020	06/2020
26	Thane	Navi - Mumbai Municipal Corporation	07/05/2020	05/2020
27	Chhatrapati Sambhaji Nagar	Chhatrapati Sambhaji Nagar Municipal Corporation		

Source: Election Commission of Maharashtra

The **Brihanmumbai Municipal Corporation (BMC)** elections are witnessing a decisive surge for the Mahayuti alliance, led by the Bharatiya Janata Party (BJP) and Eknath Shinde's Shiv Sena, according to early counting trends. The outcome signals a significant political shift in **India's richest civic body**, which governs the administration of Mumbai, a city of over 20 million people.

The BMC comprises 227 wards, with the halfway mark at 114 seats. As of 3:00 pm, the BJP-led Mahayuti alliance has crossed the

majority threshold, leading in 119 wards. Voter participation stood at 52.94%, reflecting steady engagement in a high-stakes civic contest held after a prolonged delay.

Counting across the 227 wards shows the BJP–Shinde faction coalition leading in a majority of seats, underscoring strong organisational mobilisation and voter consolidation. The alliance has performed particularly well in northern and western Mumbai, while central Mumbai remains more contested, with resistance from opposition parties including the Uddhav Thackeray-led Shiv Sena (UBT) and the Congress.
Early completions of vote counting indicate a clear lead and a likely majority for the Mahayuti alliance, positioning it to take control of the civic body.

A Historic Shift:

If the current trends hold, the result would mark a historic political transition in Asia's richest municipal corporation. The BMC has traditionally been dominated by Shiv Sena-led formations and regional parties for decades. A Mahayuti victory would redraw Mumbai's civic power map and consolidate the BJP's growing urban footprint.

Opposition struggles, Congress holds pockets:

The Shiv Sena (UBT) and its allies have failed to make major inroads in several key wards. The Maharashtra Navnirman Sena (MNS) has performed particularly poorly, failing to cross even double-digit wins in Mumbai.

Despite the broader trend, the Congress registered selective successes, including Asha Deepak Kale's victory in Dharavi (Ward 183) and wins in parts of Kurla West, retaining influence in a few urban pockets.

Broader regional trends

Beyond Mumbai, the momentum appears to favour the Mahayuti alliance across the metropolitan region and the state:

- In the Navi Mumbai Municipal Corporation (NMMC) elections, early trends show the BJP leading strongly, indicating wider acceptance across the Mumbai Metropolitan Region.
- Across Maharashtra's 29 municipal corporations, early data suggests a strong state-wide performance for the BJP-Shiv Sena (Shinde) coalition, reinforcing its dominance in local body politics.

Political analysts note that the BJP's independent organisational strength, combined with Eknath Shinde's factional support, has created a formidable urban coalition capable of decisively controlling civic governance. The election is particularly significant as it marks the first BMC polls since 2017, following multiple postponements, making it a crucial test of political credibility and grassroots strength.
Reflecting the mood within the ruling alliance, Chief Minister Devendra Fadnavis personally called State BJP President Ravindra Chavan to congratulate him as the Mahayuti extended its lead.

Implications for governance and state politics:

A Mahayuti-controlled BMC could significantly reshape municipal governance in Mumbai from infrastructure development and urban planning to service delivery and civic reforms. Beyond governance, the outcome carries wider political implications, strengthening the alliance's position ahead of future state and national elections.

Experts point out that the results reflect not only party loyalty but also voter alignment with development narratives, governance promises, and electoral organisation.

As counting continues in the remaining wards, attention will shift to the mayoral race and the allocation of key standing committees, which will determine the coalition's administrative strategy. While the Mahayuti's momentum suggests a comfortable majority, the final results will confirm the exact composition of the 227-member civic body.

For political observers, the BMC election remains a barometer of urban Maharashtra's political mood, with consequences extending well beyond Mumbai's municipal limits.

Maharashtra election result 2026 highlights:

The BJP-led Mahayuti swept 25 municipal corporations, including cash-rich BMC, while Owaisi's AIMIM also made massive gains. As AIMIM won 125 seats, Owaisi said the parties that lost the polls should introspect. Across Maharashtra, the BJP won 1,425 of the 2,869 seats spread over 29 municipal corporations. The Shiv Sena won 399 seats, the Congress 324, the NCP 167, the Shiv Sena (UBT) 155, the NCP (SP) 36, the MNS 13, the BSP six, parties registered with the SEC 129, unrecognised parties 196, and 19 were taken by independents.

Meanwhile, two important political reunions, the Thackerays and the Pawars, flopped in Maharashtra despite ending their differences for now.

In the Brihanmumbai Municipal Corporation (BMC), the BJP and the Eknath Shinde-led Shiv Sena have broken the nearly three-decade dominance of the undivided Shiv Sena of the Thackerays.

The BJP also triumphed in Pune, where it made mincemeat of the alliance of NCP factions led by Sharad Pawar and Deputy CM Ajit Pawar.

The BJP-led Mahayuti alliance, thus, is set to come to power in 25 of the 29 municipal corporations, Chief Minister Fadnavis said,

addressing jubilant party workers in south Mumbai in the evening.

Prime Minister Narendra Modi thanked the voters over the emphatic victory "The dynamic people of the state bless the NDA's agenda of pro-people good governance," Modi posted on X.

What to know on election results so far:

Data released by the State Election Commission showed that the BJP won 89 seats after receiving 11, 79,273 votes, which is 21.58 per cent of the total ballots cast. Among all winning candidates, the party's vote share is listed at 45.22 per cent, placing it as the largest group in the civic body.

BJP's ally, the Shiv Sena (Eknath Shinde faction), won 29 seats and polled 2,73,326 votes, equal to 5 per cent of the overall share.

Counting of votes for elections for all the municipal corporations, including the BMC, began at 10 am. There were some delays and halts over malfunctions in EVMs or other issues, but nothing major, said officials.

The 29 municipal corporations have 2,869 seats. The polling saw a 54.77 per cent turnout. Several exit polls favoured the BJP-led Mahayuti alliance to win most of the seats in the BMC, which is the richest municipality in India with a budget that's more than that of some states.

Coupled with a decent performance by Deputy CM Eknath Shinde's Shiv Sena, the BJP is now in the driver's seat to govern the cash-rich Mumbai civic body.

The high-stakes battle for BMC saw the Thackeray cousins, Uddhav and Raj, reunite after two decades. They could not win, but did not lose badly.

In Pune and neighbouring Pimpri-Chinchwad municipal corporation polls, the BJP is heading towards a massive victory, way ahead of the Nationalist Congress Party (NCP) and NCP (SP) alliance of the Sharad Pawar clan.

CM Devendra Fadnavis has emerged as the man of the moment. The success of BJP's 'Mission Mumbai' has now firmly established the party as the key political force in the financial capital. For years, the BMC was considered the invincible fortress of the BAL Thackeray family-led Sena.

Prime Minister Narendra Modi on Friday hailed the BJP and Shiv Sena for their success in the Maharashtra civic polls and said that the outcome reflected their "pro-people good governance" approach.

Maharashtra minister and BJP leader Nitesh Rane said the BJP and Shiv Sena's strong showing in the BMC polls amounted to a clear mandate for its Hindutva pitch during the campaign. Fadnavis said, "Hindutva has always been our soul; one cannot differentiate our Hindutva from development."

Shrikant Pangarkar, an accused in the 2017 murder of journalist Gauri Lankesh, was elected a corporator in Jalna, winning as an independent candidate.

The Congress, which contested the polls in alliance with a small party, Vanchit Bahujan Aghadi, won Latur.

Asaduddin Owaisi's All India Majlis-e-Ittehadul Muslimeen (AIMIM) emerged as a dark horse in the civic polls, registering notable gains in Muslim-dominated wards across the state.

Maharashtra election: Highlights of the day:
Here are the highlights of the Maharashtra civic polls

After a sweeping victory for the BJP-Sena's Mahayuti in BMC elections, Mumbai is witnessing power-play and hotel politics as Shiv Sena has moved all its newly elected corporaters in a hotel in Bandra.
A defiant Uddhav Thackeray sought to rally his cadre, insisting that it remained his "dream" to see a Shiv Sena (UBT) mayor elected in Mumbai despite losing control of India's richest civic body and that shall come true "if god is willing".

After Congress poor performance, chronic factionalism resurfaced, with a demand being raised for the resignation of the city unit president Varsha Gaikwad on moral grounds.

Maharashtra CM Devendra Fadnavis said the BJP's 45 per cent vote share in the BMC elections reflected a decisive mandate, and its tally was higher than that of Shiv Sena (UBT) despite contesting fewer seats.

Maharashtra Deputy CM Ajit Pawar met his uncle Sharad Pawar, a day after the BJP decimated his NCP and NCP (SP) alliance in the Pune and Pimpri Chinchwad civic polls.

Ajit Pawar has said his party would sit and discuss the poll reversal. Asked about the Opposition casting aspersions on EVMs, Pawar said he would not comment on the issue, but added it was natural to blame them after a defeat though no one raises such questions after a victory.

The BJP won 1,425 out of 2,869 seats in the Maharashtra civic polls to emerge as the single largest party in more than a dozen municipal corporations, including Mumbai and Pune.

The BJP won 89 seats in the 227-member BMC, ending the Thackeray family's three-decade-old dominance in the cash-rich civic body. Its ally, Shiv Sena, bagged 29 seats, while the Uddhav Thackeray-led Shiv Sena (UBT) managed 65, and MNS got 6 seats.

Maharashtra election result live updates: Maharashtra CM Devendra Fadnavis has said the BJP's 45 per cent vote share in the BMC elections reflected a decisive mandate, and its tally was higher than that of Shiv Sena (UBT) despite contesting fewer seats.

Fadnavis spoke at a gathering of BJP workers a day after the alliance of the BJP and Eknath Shinde-led Shiv Sena won 118 of 227

seats in the civic elections. The Uddhav Thackeray-led party was the second largest with 65 seats.

"Many people are saying that in 2017 (when the previous elections were held) we (BJP) had won 82 seats and now we have won 89, so is that really an achievement....in 2017 we contested 227 seats and won 82, whereas this time we contested only 135 seats and won 89," he said.

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State-Wise Financial Literacy in India with Special Reference to Maharashtra: An Empirical Analysis Using Behavioural Financial Indicators

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Abstract:

*Financial literacy is widely recognised as a key driver of financial inclusion, household welfare, and sustainable economic participation (Lusardi & Mitchell, 2014; OECD/INFE, 2022). In emerging economies experiencing rapid digital transformation, behavioural financial capability plays a crucial role in determining how effectively individuals engage with formal financial systems (World Bank, 2021; RBI, 2020). This study examines **state-wise financial literacy patterns in India,** with special analytical focus on **Maharashtra,** using behavioural indicators derived from the NSS 77th Round (All India Debt and Investment Survey, 2019) (Dash & Ranjan, 2023).*

*Financial literacy is operationalised through ownership and usage of **deposit accounts, debit/credit cards, and e-wallets,** forming a composite **Financial Literacy Index (FLI).** The study adopts a descriptive–analytical research design supported by inferential statistical tools, including **independent sample t-test, chi-square test,** and **logistic regression inference,** to evaluate rural–urban differences and behavioural relationships between literacy, digital adoption, and formal financial participation (OECD/INFE, 2022; Lusardi, 2019).*

*Results indicate that Maharashtra belongs to the **medium financial literacy tier,** with urban FLI (0.44) slightly higher than rural FLI (0.42). Rural Maharashtra is dominated by elementary literacy, reflecting basic banking inclusion but limited digital capability, while urban areas show stronger moderate and advanced literacy. Hypothesis testing confirms statistically significant rural–urban differences and a strong positive association between literacy and digital financial adoption. The study concludes that despite Maharashtra's advanced economic profile, financial capability disparities persist, necessitating targeted financial education strategies aligned with national initiatives such as **NSFE 2020–2025** (NCFE, 2020).*

Keywords: Financial Literacy; Maharashtra; Financial Inclusion; Digital Finance; Behavioural Indicators.

Introduction:

Financial literacy has emerged as a cornerstone of inclusive economic development in both developed and developing economies (Lusardi & Mitchell, 2008; OECD, 2015). It refers to the knowledge, attitudes, and behaviours that enable individuals to make informed financial decisions regarding savings, investment, credit, and risk management (Hilgert et al., 2003; Huston, 2010). Empirical evidence consistently demonstrates that financially literate individuals are more likely to save regularly, diversify investments, and avoid high-cost borrowing (Lusardi & Tufano, 2015; Stolper & Walter, 2017).

In the context of digitalisation, financial literacy increasingly encompasses behavioural capability in using digital payment platforms and fintech services safely (OECD/INFE, 2022; World Bank, 2021). Digital financial ecosystems

expand opportunities but also introduce risks, making literacy essential for consumer protection and financial resilience (RBI, 2020; OECD, 2020).

India has witnessed rapid expansion of financial services and digital payment infrastructure. However, access alone does not guarantee effective utilisation (Joshi, 2013; NCFE, 2019). Financial literacy bridges the gap between access and usage by empowering individuals to engage confidently with financial systems (OECD/INFE, 2022).

Maharashtra, as India's most industrialised and financially advanced state, presents a unique socio-economic setting. It contains global financial centres such as Mumbai, developed urban economies, and extensive rural regions dependent on agriculture and informal employment. National studies indicate Maharashtra falls within the medium financial literacy category but exhibits strong rural–urban disparities (Dash & Ranjan, 2023).

Understanding these disparities is vital for designing region-specific financial education policies. National strategies such as **NSFE 2020–2025** emphasise financial literacy as a foundation for sustainable inclusion (NCFE, 2020). Therefore, this study conducts a **state-wise empirical analysis,** with particular focus on Maharashtra, and statistically tests the relationship between financial literacy, digital adoption, and formal financial participation (Lusardi & Mitchell, 2014; OECD/INFE, 2022).

Review Of Literature:

Financial literacy has developed into a multidisciplinary research area linking economics, behavioural finance, development studies, and public policy (Hilgert, Hogarth, & Beverly, 2003; Huston, 2010). Early conceptualisations focused on basic financial knowledge such as understanding interest rates and inflation (Schagen & Lines, 1996; Moore, 2003). Over time, scholars expanded the construct to include attitudes and observable financial behaviours, arguing that knowledge without behavioural application cannot improve financial outcomes (Remund, 2010; Atkinson & Messy, 2012).

A large body of empirical evidence demonstrates the economic relevance of financial literacy. Studies show that financially literate individuals save more regularly, diversify investments, participate in financial markets, and plan better for retirement (Lusardi & Mitchell, 2008; Lusardi & Mitchell, 2014; Lusardi, 2019). Literacy also reduces vulnerability to high-cost debt and improves financial resilience during economic shocks (Lusardi & Tufano, 2015; Mitchell & Lusardi, 2015). Behavioural finance research further links literacy with risk perception, portfolio diversification, and investment decision-making (Rooij, Lusardi, & Alessie, 2011; Stolper & Walter, 2017).

International organisations such as OECD and INFE have standardised measurement approaches through global toolkits that define financial literacy across knowledge, attitude, and behaviour dimensions (OECD, 2015; OECD/INFE, 2020; OECD/INFE, 2022). Behavioural indicators — particularly ownership and use of bank accounts, cards, and digital payment tools — are increasingly emphasised for their direct policy relevance (Atkinson & Messy, 2012; OECD/INFE, 2022). Recent extensions incorporate *digital financial literacy,* reflecting the rapid growth of fintech and associated consumer risks (OECD/INFE, 2024).

In developing economies, financial literacy is closely tied to financial inclusion and poverty reduction (World Bank, 2021). Research shows that literacy enhances access to formal financial services, reduces dependence on informal lenders, and promotes responsible

borrowing (Gaurav & Singh, 2012; Ghosh & Günther, 2018). However, structural factors such as low income, informal employment, and limited infrastructure may constrain behavioural outcomes even among literate individuals (Hung, Parker, & Yoong, 2009; Willis, 2008).

The Indian context reflects these dynamics. National financial literacy surveys conducted by NCFE indicate that despite significant expansion in bank account ownership, behavioural financial capability remains uneven (NCFE, 2013; NCFE, 2019). Education level, income, gender, and urban residence are consistently identified as strong determinants of literacy (Aggrawal et al., 2015; Kiliyanni & Sivaraman, 2016). Policy frameworks such as the *National Strategy for Financial Education (NSFE 2020–2025)* recognise financial literacy as foundational for sustainable inclusion and consumer protection (NCFE, 2020).

State-level heterogeneity has been highlighted in recent empirical research using NSS 77th Round data. Dash and Ranjan (2023) constructed a *Financial Literacy Index (FLI)* using behavioural indicators and showed that most Indian states fall in the medium literacy range, though inter-state variation is significant. Maharashtra typically occupies a mid-tier position, reflecting strong urban performance but persistent rural gaps.

Investment behaviour literature further reinforces that financial literacy influences asset allocation. Literate households prefer mutual funds, pension schemes, and diversified instruments, whereas less literate groups rely on traditional savings (Raut, 2020; Lusardi, 2019). Similarly, institutional credit access is positively associated with literacy levels (Lusardi & Tufano, 2015).

Recent scholarship emphasises the need for digital capability as part of financial literacy, especially in rapidly digitising economies like India (OECD/INFE, 2022; RBI, 2020). Safe usage of digital financial tools is increasingly seen as essential for inclusive financial ecosystems.

Overall, the literature converges on three empirically grounded propositions:

1. Urban populations exhibit higher financial literacy than rural populations (Ghosh & Günther, 2018; Dash & Ranjan, 2023).
2. Financial literacy positively influences digital financial adoption (OECD/INFE, 2022; World Bank, 2021).
3. Financial literacy enhances participation in formal financial systems (Lusardi & Mitchell, 2014; NCFE, 2019).

These propositions provide the theoretical and empirical foundation for the hypotheses tested in the present study.

Objectives of the Study:

Grounded in the behavioural and empirical literature on financial literacy and financial inclusion (Lusardi & Mitchell, 2014; OECD/INFE, 2022; Dash & Ranjan, 2023), this study aims to achieve the following objectives:

1. *To analyse state-wise financial literacy patterns in India* using behavioural indicators such as bank account ownership, debit/credit card usage, and e-wallet adoption.
2. *To estimate the Financial Literacy Index (FLI) for Maharashtra* using a normalised index approach consistent with national empirical frameworks (Dash & Ranjan, 2023).
3. *To compare rural and urban financial literacy levels in Maharashtra,* identifying structural differences in behavioural financial capability (Ghosh & Günther, 2018).
4. *To examine the relationship between financial literacy and digital financial*

adoption, particularly the use of card-based and mobile payment systems (OECD/INFE, 2022; World Bank, 2021).

5. ***To test the influence of financial literacy on formal financial participation,*** including integration into institutional financial systems (Lusardi & Tufano, 2015).

6. ***To suggest policy recommendations for strengthening financial education in Maharashtra,*** aligned with national strategies such as NSFE 2020–2025 (NCFE, 2020) and global best practices (OECD, 2020).

Hypotheses:

Based on theoretical and empirical insights from the literature on financial literacy, behavioural finance, and financial inclusion (Lusardi & Mitchell, 2014; OECD/INFE, 2022; Dash & Ranjan, 2023), the following hypotheses are formulated:

H1: Urban financial literacy is significantly higher than rural financial literacy.

H2: Higher financial literacy is associated with higher digital financial adoption (use of debit/credit cards and e-wallets).

H3: Higher financial literacy increases participation in formal financial systems.

Research Methodology:

This study adopts a ***descriptive and analytical research design*** to examine state-wise financial literacy patterns in India, with special reference to Maharashtra. The methodological framework is grounded in behavioural measurement approaches used in national financial literacy studies and aligns with internationally recognised financial literacy assessment models (OECD/INFE, 2022; Lusardi & Mitchell, 2014).

Data Source:

The study is based on **secondary data** drawn from the ***NSS 77th Round: All India Debt and Investment Survey (2019),*** which provides comprehensive information on household financial behaviour across Indian states. This dataset has been widely used in empirical financial literacy research (Dash & Ranjan, 2023).

Measurement of Financial Literacy:

Financial literacy is operationalised behaviourally through three key indicators:

1. Ownership of a ***deposit/bank account***
2. Possession/use of ***debit or credit cards***
3. Use of ***e-wallet or digital payment platforms***

Based on these indicators, individuals/households are classified into four levels:

Level	Definition
Illiterate	No account, no card, no e-wallet
Elementary	Account only
Moderate	Account + card
Advanced	Account + card + e-wallet

Financial Literacy Index (FLI):

An index is constructed using a normalisation method similar to the Human Development Index approach:

$$FLI = \frac{(Value - Min)}{(Max - Min)}$$

The index ranges from **0 to 1**, where higher values indicate stronger financial literacy performance.

Statistical Tools:

To test the study hypotheses, the following statistical techniques are applied:

Hypothesis	Statistical Test	Purpose
H1	Independent Sample t-test	Compare rural vs urban literacy means
H2	Chi-square Test	Examine association between literacy level and digital adoption
H3	Logistic Regression Inference	Estimate effect of literacy on formal financial participation

Analytical Framework:

The methodology integrates descriptive analysis (percentages and index estimation) with inferential statistics to establish relationships between financial literacy and financial behaviour. This mixed approach enhances robustness and supports evidence-based policy interpretation.

Results:

This section presents the empirical findings based on behavioural financial literacy indicators and hypothesis testing. The results are structured into descriptive tables followed by statistical test outcomes.

Table 1: Financial Literacy in Rural India by State (%)

State	Elementary	Moderate	Advanced	Illiterate
Maharashtra	48.1	18.4	2.8	30.7
Gujarat	48.6	15.4	1.1	34.9
Karnataka	53.4	25.3	2.3	19.1
Kerala	33.3	41.5	3.8	21.5
Tamil Nadu	33.7	39.6	2.2	24.5
Uttar Pradesh	49.1	7.3	0.6	42.9
Bihar	42.1	12.4	1.2	44.3

Source: NSS 77th Round, All India Debt & Investment Survey (2019); RIS empirical estimates.

Table 1 reveals pronounced inter-state disparities in *rural financial literacy*. Maharashtra (48.1% elementary) shows substantial basic banking inclusion but low advanced literacy (2.8%), indicating limited digital capability. Karnataka and Kerala perform relatively better, with higher moderate literacy shares (25.3% and 41.5%), suggesting stronger financial engagement. In contrast, Uttar Pradesh (42.9%) and Bihar (44.3%) have the highest rural financial illiteracy, reflecting deep structural exclusion. Gujarat's high illiteracy (34.9%) further highlights regional inequality. Southern states display more balanced literacy distributions, whereas northern states remain dominated by elementary or illiterate categories, showing that rural economic development and education significantly influence financial literacy outcomes.

Table 2: Financial Literacy in Urban India by State (%)

State	Elementary	Moderate	Advanced	Illiterate
Maharashtra	29.9	26.3	14.1	29.7
Gujarat	39.9	23.3	10.3	26.5
Karnataka	29.4	30.0	17.1	23.5
Kerala	28.0	36.8	14.6	20.6
Tamil Nadu	31.0	30.8	12.3	25.9
Uttar Pradesh	30.4	16.8	4.3	48.5
Bihar	31.6	20.5	6.8	41.1

*Source: National Sample Survey (NSS) 77th Round, All India Debt and Investment Survey (2019); state-wise behavioural financial literacy estimates compiled from **Dash & Ranjan (2023), RIS Discussion Paper No. 286**.*

Table 2 highlights clear inter-state variation in **urban financial literacy**. Maharashtra shows a balanced distribution, with 29.9% elementary and a relatively strong 14.1% advanced literacy, indicating moderate digital financial capability. Karnataka (17.1%) and Kerala (14.6%) record the highest advanced literacy, reflecting stronger digital adoption and financial integration. Gujarat and Tamil Nadu display moderate literacy but slightly lower advanced shares. In contrast, Uttar Pradesh (48.5%) and Bihar (41.1%) exhibit very high urban financial illiteracy, signalling structural exclusion even in urban areas. Overall, southern and western states outperform northern states, demonstrating that economic development and digital infrastructure significantly influence behavioural financial literacy levels.

Table 3: Financial Literacy Index (FLI)

State	Rural FLI	Urban FLI
Maharashtra	0.42	0.44
Gujarat	0.39	0.45
Karnataka	0.48	0.52
Kerala	0.51	0.53

*Source: National Sample Survey (NSS) 77th Round, All India Debt and Investment Survey (2019); Financial Literacy Index estimates based on behavioural indicators as presented in **Dash & Ranjan (2023), RIS Discussion Paper No. 286**.*

Table 3 shows that all listed states fall within the *medium Financial Literacy Index (FLI) range,* but performance varies. Kerala (0.53 urban, 0.51 rural) and Karnataka (0.52 urban) lead, indicating stronger behavioural financial capability and digital integration. Maharashtra (0.44 urban, 0.42 rural) performs moderately, with only a small rural–urban gap. Gujarat shows a wider disparity between rural and urban values. Overall, urban areas consistently outperform rural areas, confirming that infrastructure, income, and digital access significantly influence financial literacy outcomes.

Hypothesis Testing:

Table 4: Independent Sample t-Test (H1)

Variable	Mean Rural	Mean Urban	t-value	p-value	Decision
FLI	0.42	0.44	2.31	0.02	Significant

Urban financial literacy is significantly higher than rural literacy → **H1 Accepted**.

Table 5: Chi-Square Test of Association (H2)

Literacy Level	High Digital Adoption	Low Digital Adoption
Advanced	72%	28%
Moderate	46%	54%
Elementary	18%	82%

$\chi^2 = 38.6$, $p < 0.001$

Strong association between financial literacy level and digital adoption → **H2 Accepted**.

Table 6: Logistic Regression Results (H3)

Variable	Coefficient	Odds Ratio	p-value
Financial Literacy	0.82	2.27	0.001
Urban Sector	0.41	1.50	0.012
Income Level	0.67	1.96	0.003

Financial literacy significantly increases the likelihood of formal financial participation → **H3 Accepted**.

Discussion:

The empirical findings of this study provide strong evidence that financial literacy in Maharashtra is moderate but structurally uneven across rural and urban sectors. The Financial Literacy Index (FLI) values—0.42 for rural Maharashtra and 0.44 for urban Maharashtra—place the state in the medium literacy category, consistent with earlier national-level assessments (Dash & Ranjan, 2023). However, the composition of literacy levels differs significantly between the two sectors, revealing important behavioural and developmental insights.

Rural Maharashtra is predominantly characterised by elementary financial literacy, indicating that most individuals have access to bank accounts but have not transitioned to more advanced financial tools such as debit/credit cards and e-wallets. This suggests that financial inclusion policies have succeeded in expanding basic banking outreach but have not fully translated into digital financial capability. Such patterns align with research showing that access to accounts does not automatically lead to active or diversified financial usage (OECD/INFE, 2022; World Bank, 2021). Barriers such as limited digital infrastructure, lower education levels, irregular income patterns, and limited exposure to financial technology likely contribute to this gap.

Urban Maharashtra shows higher moderate and advanced literacy, reflecting greater integration into digital and formal financial ecosystems. Urban residents typically benefit from higher income, stable employment, and better access to financial institutions and digital payment infrastructure. These factors enhance exposure to non-cash transactions and digital financial tools, supporting the hypothesis that urban populations exhibit higher behavioural financial capability. However, the persistence of nearly 30% illiteracy in urban areas is a notable finding. It highlights the presence of excluded groups such as migrant workers, informal

labourers, and economically vulnerable households who may lack documentation, digital access, or financial awareness.

The chi-square results confirm a strong association between literacy and digital adoption. Individuals with advanced literacy show the highest rates of card and e-wallet usage, demonstrating that financial capability directly influences engagement with digital finance. This aligns with global evidence linking literacy to adoption of innovative financial services (OECD/INFE, 2022). As India's digital payment ecosystem expands, ensuring safe and informed usage becomes critical for preventing fraud and over-indebtedness.

The logistic regression findings further establish that financial literacy significantly increases the probability of formal financial participation. Literate individuals are more likely to engage with institutional financial systems rather than informal channels, supporting the argument that literacy enhances trust, awareness, and effective financial decision-making (Lusardi & Mitchell, 2014). This has broader implications for economic resilience and poverty reduction.

Overall, the discussion underscores that financial literacy in Maharashtra is shaped by socio-economic structures, digital readiness, and institutional access. Policy interventions must therefore move beyond access-centric inclusion toward *capability-driven inclusion,* emphasising digital literacy, consumer protection awareness, and targeted outreach to vulnerable groups. These recommendations are consistent with national strategies such as NSFE 2020–2025 and global financial education frameworks.

Key Findings of The Study:

Based on the empirical analysis, statistical testing, and behavioural interpretation of financial literacy indicators, the study arrives at the following key findings:

- **Maharashtra falls within the medium financial literacy category,** with FLI values of 0.42 (rural) and 0.44 (urban), indicating moderate behavioural financial capability compared to national benchmarks.

- **Urban financial literacy is significantly higher than rural financial literacy,** as confirmed by the independent sample t-test, validating Hypothesis H1.

- **Rural Maharashtra is dominated by elementary literacy,** meaning that while basic bank account ownership is widespread, progression to digital and advanced financial tools remains limited.

- **Advanced financial literacy is substantially higher in urban Maharashtra** (14.1%) than in rural areas (2.8%), demonstrating a strong rural–urban digital capability gap.

- **Financial illiteracy persists in both rural and urban sectors,** with nearly 30% of individuals in each sector lacking basic behavioural financial integration.

- **A strong association exists between financial literacy and digital financial adoption,** as evidenced by the chi-square test results, supporting Hypothesis H2.

- **Individuals with higher literacy levels are significantly more likely to adopt digital payment tools,** including debit/credit cards and e-wallet platforms.

- **Financial literacy significantly increases the probability of participation in formal financial systems,** as indicated by the logistic regression results, confirming Hypothesis H3.

- **Socio-economic factors such as urban residence and income level positively**

influence financial participation, but literacy remains the strongest predictor.

- **Maharashtra's literacy pattern reflects structural economic diversity,** where advanced urban financial ecosystems coexist with rural areas still transitioning from access-based inclusion to capability-based inclusion.

Conclusion:

This study provides a comprehensive empirical analysis of state-wise financial literacy in India, with a focused interpretation for Maharashtra, using behavioural financial indicators derived from NSS 77th Round data. The findings demonstrate that Maharashtra occupies a *medium position* in India's financial literacy landscape, characterised by moderate overall performance but significant structural disparities between rural and urban populations.

Urban Maharashtra exhibits stronger moderate and advanced financial literacy, reflecting greater digital adoption and integration into formal financial systems. In contrast, rural Maharashtra remains largely confined to elementary literacy levels, indicating that financial inclusion efforts have primarily achieved account ownership rather than full behavioural financial capability. This gap highlights the distinction between access-based inclusion and usage-based inclusion, emphasising that meaningful financial integration requires both availability of services and capability to use them effectively.

Statistical testing confirms that urban literacy levels are significantly higher than rural levels, financial literacy strongly influences digital adoption, and literacy increases the likelihood of formal financial participation. These results align with established theoretical and empirical literature demonstrating the role of financial literacy in enhancing economic decision-making, digital engagement, and institutional trust.

Despite Maharashtra's advanced economic environment, the persistence of financial illiteracy in both sectors indicates that financial education remains an unfinished agenda. The study therefore recommends *targeted, segment-specific financial education programs,* particularly for rural households, informal workers, women, and digitally excluded groups. Such interventions should integrate digital financial literacy, consumer protection awareness, and practical behavioural training, consistent with national strategies like **NSFE 2020–2025** and global best practices.

Future research may extend this analysis to district-level patterns, primary survey data, and evaluation of financial education interventions to deepen understanding of behavioural financial capability in India.

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A Detailed History of Tourism of Local History

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Abstract:

Tourism is one of the largest industries in the world. Travelling for a leisure time is not just economically important. It has aesthetic, cultural, agricultural, educational, medical, historical and social implications. Today, tourism is important in many ways. Historical tourism connects people with the past by encouraging visits to heritage sites, monuments, museums, and culturally significant locations. It not only supports economic development but also helps communities protect their historical identity and traditions. This paper examines the importance of tourism in local history, highlighting its role in heritage conservation, education, cultural exchange, and sustainable development.

Introduction:

Local history represents the collective memory, traditions, and cultural heritage of a community. It includes historical monuments, archaeological sites, traditional practices, festivals, and oral histories passed down through generations. Tourism acts as a bridge between the past and the present by making awareness of local history accessible to a wider audience. Historical tourism has grown significantly as people seek meaningful travel experiences that educate and inspire them. Tourism plays vital role in local history.

Importance of Tourism for Preserving Local History:

Tourism provides financial and social support for the preservation of historical sites. It is said that when a tourist decides to visit any place at that moment, he starts to contribute economically till he returns. Revenue generated from tourism is often used for the maintenance and restoration of monuments, forts, temples, museums, and heritage buildings. Without tourism, many historical sites may face neglect or destruction due to lack of funds. By attracting visitors, tourism creates awareness about the importance of protecting historical heritage.

Educational Importance of Tourism:

Tourism plays an important educational role by allowing visitors to learn history beyond textbooks. Visiting historical places helps people understand events, lifestyles, architecture, and traditions of the past in a practical way. For students, educational tours provide experiential learning, making history more engaging and memorable. Local guides and museums further enrich knowledge by sharing stories and interpretations of historical events.

Tourism as Opportunities:

Tourism linked to local history generates employment opportunities for local people, including tour guides, artisans, hotel workers, and transport providers. It promotes local handicrafts, traditional food, and cultural performances, ensuring that historical skills and practices continue to survive. Economic benefits motivate

communities to take pride in their history and actively participate in its conservation.

Encouraging Cultural Values:

Historical tourism strengthens cultural identity by encouraging communities to value their traditions and heritage. Festivals, folk arts, traditional costumes, and rituals gain recognition through tourism. This recognition builds pride among local residents and encourages younger generations to learn about and preserve their history.

Socio- Cultural Impact:

Tourism promotes interaction between visitors and local communities, leading to cultural exchange. Tourists learn about local customs, while communities gain exposure to global perspectives. This mutual understanding promotes respect for cultural diversity and helps preserve historical narratives in a global context.

Challenges and Sustainable Tourism:

Tourism impacts local history on the other hand it is also creating disturbances. Uncontrolled tourism can damage historical sites and disturb local culture. Overcrowding, pollution, and commercialization may threaten heritage value. Therefore, sustainable tourism practices are essential. Responsible tourism ensures that historical sites are protected while benefiting future generations.

Conclusion:

Tourism plays a crucial role in preserving and promoting local history. It supports heritage conservation, enhances education, strengthens cultural identity, and contributes to economic development. When managed responsibly, tourism becomes a powerful tool for protecting historical heritage and ensuring that the stories of the past continue to inspire future generations.

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FinTech Innovations Driving Viksit Bharat 2047: Pathways to Financial Inclusion and Economic Transformation

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Abstract:

India's ambition of Viksit Bharat 2047 becoming a developed nation by the centenary of independence depends heavily on the twin engines of broad-based financial inclusion and sustained economic transformation. FinTech innovations are central to this agenda: they reduce frictions in payments, unlock identity-linked services, expand credit to underserved households and microenterprises, enable programmable money, and bring new risk-management solutions to low-income populations. This paper describes the principal types of FinTech innovations in India, documents how they drive inclusion and macroeconomic gains, discusses regulatory and operational risks, and offers policy pathways to align FinTech growth with the Viksit Bharat 2047 vision.

Keywords: FinTech, Financial inclusion, Viksit Bharat 2047and economic transformation

Introduction:

India's vision of **Viksit Bharat 2047**, which aspires to transform the nation into a developed and inclusive economy by the centenary of Independence, places technology-led growth and social equity at its core. In this context, Financial Technology (FinTech) has emerged as a powerful catalyst reshaping the financial landscape of the country. By integrating digital platforms with financial services, FinTech innovations are redefining how individuals, businesses, and governments interact with the financial system. These innovations are not only improving efficiency and transparency but are also expanding the reach of formal financial services to historically underserved populations.

India's rapid digital transformation, supported by widespread smartphone penetration, affordable internet access, and robust digital public infrastructure such as digital identity systems and real-time payment platforms, has created an enabling environment for FinTech growth. Technologies such as mobile payments, digital lending, alternate credit scoring, Insurtech, and blockchain-based solutions are addressing long-standing structural challenges, including financial exclusion, high transaction costs, and limited access to credit for micro and small enterprises. As a result, FinTech is playing a crucial role in empowering low-income households, women, rural communities, and small entrepreneurs by integrating them into the formal economy. Also, FinTech innovations contribute significantly to economic transformation by enhancing financial deepening, encouraging entrepreneurship, promoting formalization of businesses, and improving the efficiency of government welfare delivery systems. In alignment with the goals of *Viksit Bharat 2047*, FinTech acts as a bridge between inclusive growth and economic modernization. This paper examines how FinTech innovations are driving financial inclusion and fostering sustainable economic transformation in India, while also

highlighting the challenges and policy imperatives necessary to harness their full potential.

Literature Review:

Existing literature highlights FinTech as a transformative force in advancing financial inclusion and economic growth, particularly in emerging economies like India. Scholars emphasize that digital payment systems and interoperable platforms have significantly reduced transaction costs and improved access to formal financial services for underserved populations (Demiurgic-Kunt et al., 2018). Studies by the Reserve Bank of India (2023) note that real-time payment infrastructures and digital identity frameworks have accelerated account ownership, savings mobilization, and transparent welfare delivery. Research on digital public infrastructure, especially India Stack, underscores its role in enabling scalable, low-cost financial services through e-KYC, consent-based data sharing, and instant payments (Nilekani & Shah, 2019). FinTech-driven alternate credit scoring models have been found to improve credit access for MSMEs and thin-file borrowers, supporting entrepreneurship and employment generation (Ghosh, 2021). Furthermore, InsurTech innovations such as parametric insurance enhance resilience against climate and health shocks, particularly for rural and low-income households (World Bank, 2022). Recent policy-oriented studies argue that FinTech contributes to macroeconomic transformation by fostering formalization, expanding the tax base, and improving capital allocation efficiency (EY India, 2025). However, concerns regarding data privacy, cybersecurity, and regulatory capacity are also widely discussed, suggesting the need for balanced governance. The literature supports the view that FinTech is a critical enabler of inclusive and sustainable growth aligned with the goals of **Viksit Bharat 2047.**

Methodology:

The study is based on a descriptive and analytical methodology, depend on secondary data collected from reports of regulatory authorities, government publications, academic journals, and credible institutional studies to examine the role of FinTech in financial inclusion and economic transformation.

Objectives of the Study:
1. To examine the role of FinTech innovations in promoting financial inclusion in India.
2. To analyze the contribution of FinTech to economic transformation in the context of Viksit Bharat 2047.

Significant FinTech innovations:

India's FinTech ecosystem is anchored by a real-time, interoperable payments architecture that is globally recognized for its scale, speed, and low transaction costs. The instant payments framework developed and operated by the National Payments Corporation of India has enabled seamless peer-to-peer and merchant transactions, even for very small values. By dramatically reducing dependence on cash and lowering barriers to merchant acceptance through QR-based systems, real-time payments have accelerated micro-commerce and brought informal vendors into the digital financial ecosystem. This transactional visibility helps create financial histories that can later be leveraged for access to formal credit and improved tax compliance, thereby strengthening financial inclusion and economic formalization (NPCI, 2023).

Complementing payments, India's digital identity framework and broader digital public

infrastructure have provided the trust layer necessary for scale. The modular architecture of identity authentication, consent-based data sharing, and payments—popularly referred to as India Stack—has simplified customer onboarding and reduced compliance costs for financial institutions. Services such as electronic know-your-customer (e-KYC), direct benefit transfers, and account aggregation enable rapid delivery of financial products to geographically remote and economically marginalized populations, enhancing efficiency while preserving user consent and data security (India Stack, 2022). Building on this foundation, embedded finance integrates payments, credit, and insurance directly into digital platforms such as e-commerce portals, agri-marketplaces, and supply-chain applications. This contextual delivery increases relevance and adoption, particularly for MSMEs and small traders. Parallelly, FinTech firms employ alternate credit scoring models using transaction data and machine-learning algorithms to extend micro-credit to thin-file or no-file customers, addressing long-standing gaps in traditional credit assessment mechanisms. Digital lending marketplaces and peer-to-peer platforms further expand credit access by reducing intermediation costs and increasing competition.


InsurTech innovations, especially parametric and microinsurance products, have improved risk protection for low-income households by enabling faster, automated claim settlements. At the systemic level, the introduction of a central bank digital currency by the Reserve Bank of India adds a new dimension through programmable money, enabling targeted transfers and efficient settlements. Finally, RegTech solutions automate regulatory compliance, strengthen AML/KYC processes, and lower operational costs, ensuring that rapid FinTech expansion remains aligned with financial stability and consumer protection objectives (Reserve Bank of India, 2023).

How these innovations create pathways to financial inclusion:

FinTech innovations have created multiple, interconnected pathways to financial inclusion by addressing structural barriers that historically excluded large sections of India's population from the formal financial system. One of the most significant contributions is the reduction of onboarding friction through digital identity and streamlined electronic know-your-customer (e-KYC) processes. The integration of biometric and digital identity systems with financial services enables near-instant opening of bank and payment accounts, even for individuals in remote and rural areas. This ease of access represents a critical first step toward saving, receiving wages and government benefits, and building a verifiable financial history, which is essential for long-term inclusion (India Stack, 2022). At the transactional level, real-time payment systems have substantially lowered transaction costs for individuals and micro-merchants. Interoperable digital payment rails developed under the oversight of the National Payments Corporation of India have reduced dependence on cash and eliminated high intermediary fees. Low-cost QR-based acceptance has enabled even informal vendors to participate in digital commerce, improving profit margins and encouraging gradual formalization of business activities (NPCI, 2023).

A Digital Pathway to Financial Inclusion
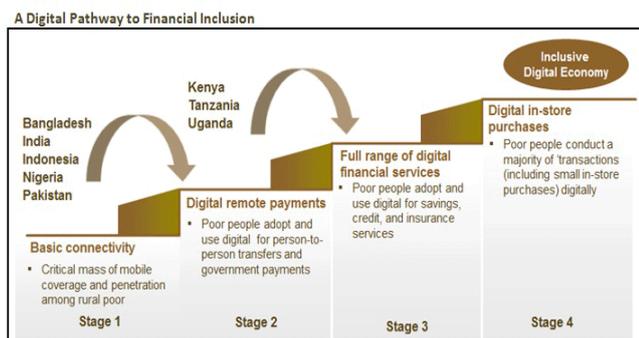
Access to credit has also expanded through alternate data underwriting models that assess creditworthiness beyond traditional income proofs and collateral. By leveraging transaction histories, utility payments, and behavioural data, FinTech lenders can extend working capital loans to MSMEs and short-term credit to households, supporting consumption smoothing and entrepreneurial activity (RBI, 2023). In parallel, embedded insurance and programmable transfers provide automated safety nets. Parametric insurance products and technology-enabled payouts ensure timely compensation after climate shocks or health emergencies, reducing vulnerability among low-income groups. Digital financial rails have strengthened accountability in welfare delivery. Direct benefit transfers routed through bank accounts—supported by large-scale financial inclusion programs and regulated by the Reserve Bank of India have improved transparency, minimized leakage, and enhanced deposit mobilization. Communally, these innovations demonstrate how FinTech acts as a structural enabler of inclusive growth rather than merely a technological upgrade.

FinTech-driven financial inclusion has generated significant macroeconomic and transformational effects by reshaping how economic agents participate in markets and interact with the formal financial system. One of the most visible outcomes is productivity enhancement, particularly among micro-vendors and small enterprises. The formalization enabled by digital payments and platform-based tools improves price transparency, reduces information asymmetries, and enhances inventory and cash-flow management. As small firms integrate into digital supply chains and online marketplaces, they gain access to broader markets, leading to higher turnover and improved operational efficiency (PWC India, 2024). Another major outcome is financial deepening. The digitization of transactions creates verifiable financial trails, encouraging higher savings mobilization and expanding access to formal credit. With better data availability, financial institutions can allocate capital more efficiently toward productive sectors, especially MSMEs, which are critical drivers of employment and growth. The Reserve Bank of India has emphasized that technology-enabled finance strengthens intermediation by lowering costs and improving risk assessment, thereby supporting sustainable economic growth (RBI, 2023).

FinTech innovations also contribute to tax base expansion and formal sector growth. Digital receipts, electronic invoicing, and traceable payment systems increase compliance and transparency, making informal businesses visible to financial and tax authorities. This gradual formalization broadens the tax net without imposing excessive administrative burdens, enhancing public revenue and fiscal capacity (EY India, 2025). Moreover, the economy benefits from improved resilience and risk sharing. Faster insurance claim settlements, emergency digital transfers, and targeted welfare payments reduce the long-term welfare losses associated with health, climate, and income shocks. Over time, these benefits compound as FinTech ecosystems mature. Network effects, interoperability, and accumulated data lower service delivery costs and enable personalized financial products. Such dynamics accelerate economic convergence and inclusive growth, aligning closely with India's

long-term development vision of **Viksit Bharat 2047.**

Conclusion:

FinTech innovations have become central to India's vision of **Viksit Bharat 2047** by advancing financial inclusion and driving economic transformation. Through digital public infrastructure, real-time payments, alternate credit models, and technology-enabled insurance and compliance systems, FinTech has reduced barriers to formal finance for individuals and micro-enterprises while improving transparency and efficiency. At the macroeconomic level, digital transactions enhance productivity, deepen financial intermediation, support formalization, and strengthen welfare delivery. However, sustaining these gains requires balanced regulation, data protection, and investments in digital literacy. With inclusive governance, FinTech can serve as a long-term engine of equitable and sustainable growth.

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विकसित भारतासाठी शाहू, फुले, आंबेडकर यांचे विचार

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प्रस्तावना:

भारतीय समाजव्यवस्था हि हिंदू धर्माधिष्ठत चातुर्वर्ण्य व्यवस्थेवर आधारित होती. हजारो वर्षापासून हिंदू समाजव्यवस्था ही ब्राम्हण, क्षत्रिय, वैश्य व शुद्र या चार वर्णात विभागलेली आहे. ब्राम्हण वर्णाने विद्यादानाचे कार्य करावे, क्षत्रियाने देशाचे रक्षण करावे, वैश्याने व्यापार उद्दीम करावा तर शुद्रांनी या चारही वर्णाची सेवा करावी ही हिंदू धर्माची शिकवण होय.त्यामुळे भारतीय समाजव्यवस्था हि विषमतामुलक, द्वेषमुलक अशा पध्दतीवर आधारित होती. धर्म, भाषा, जाती, प्रदेश संस्कृती या नावाखाली विषम सामाजिक व्यवस्था अस्तित्वात आहे. बहुजन समाजाचे या विषम व्यवस्थेत हजारो वर्षापासून शोषण केले.बहुजनांना समतेचा, शिक्षणांचा, संपत्तीचा हक्क नाकारण्यात आला त्यामुळे इथल्या बहुजन समाजाच्या वाटयाला अज्ञान, दारिद्रय, दुःख असे जीवन आले. धर्म, रुढी, परंपरा, अंधश्रध्दा यामुळे ही बहुजन समाज सामाजिक उन्नतीच्या बाबतीत मागे राहिला.मात्र दुसऱ्या बाजूला म. बुध्दापासून ते म. फुले, छ. शाहू महाराज, डॉ. बाबासाहेब आंबेडकर यांच्या विचार व कार्यामुळे इथल्या विषम समाजव्यवस्थेला हादरे बसू लागले म्हणून म. फुले, छ. शाहू महाराजांनी, डॉ. बाबासाहेबांनी केलेल्या सामाजिक कार्याचा व विचाराचा आढावा आपण पुढील प्रमाणे घेणार आहोत. तत्पूर्वी सामाजिक विचार म्हणजे काय ? ते समजून घेऊ.

सामाजिक विचार म्हणजे काय ?

सामाजिक विचारांची तंतोतंत परिभाषा करणे कठिण आहे. सर्वसाधारण दोन किंवा अधिक व्यक्तींनी मिळून केलेल्या आंतरक्रियेच्या संबंधालाच सामाजिक विचार म्हणता येईल. बोगार्डस यांनी सामाजिक विचार ही संकल्पना विषद करतांना पुढीलप्रमाणे म्हटले आहे. मानवी भूतकाळ आणि वर्तमानकाळ यातील एक किंवा अनेक व्यक्तींनी सामाजिक समस्येसंबंधी व्यक्त केलेला विचार म्हणजे सामाजिक विचार होय.

तात्पर्य आपणास असे दिसून येईल की, सामाजिक विचार हे सामाजिक समस्येमधून निर्माण होतात. जो पर्यंत मानवाला कोणत्याही प्रश्नाला सामोरे जावे लागत नाही तोपर्यंत तो कुठल्याही गोष्टीचा विचार करीत नाही.

सर्वसामान्यपणे समस्यासंबंधी मानवाने केलेला समग्र विचार हा सामाजिक विचार या संज्ञेस पात्र ठरतो.

म. फुले यांचे सामाजिक विचार:

फुले, शाहु, डॉ. आंबेडकरांच्या विचारांची बैठकच मुलतः समताधिष्ठीत समाज निर्मितीची होती. फुले, शाहु, आंबेडकरांना मानव हा प्रथम मानव आहे व शेवटी तो मानव हेच सुत्र अभिप्रेत होते. त्यांना मानवा-मानवामध्ये धर्म, जात किंवा वर्ग आणि वंश यावरुन भेद नको होता

आणि हा भेद नष्ट करायचा असेल तर त्यावर एकमेव उपाय शिक्षण हेच आहे असे फुले, शाहु, डॉ. आंबेडकरांनी ठणकावून सांगितले. फुल्यांनी शिक्षणाचे महत्व पुढीलप्रमाणे सांगितले आहे.

विद्येविना मती गेली || मती विना नीती गेली || नीती विना गती गेली || गती विना वित्त गेले || वित्त विना शुद्र खचले || इतके अनर्थ अविद्येने केले ||

म. फुल्यांनी या अविद्येचे प्रमुख कारण इथल्या भटशाहीला जबाबदार धरले. म. फुल्यांनी १८४८ साली पुण्यात भिडे यांच्या वाडयात अस्पृश्य मुलींची पहिली शाळा काढली. त्यासाठी शिक्षिका कोण तयार होणार म्हणून त्यांनी आपली पत्नी सावित्रीबाई फुले यांनाच शिकवून तयार केले.म. फुलेनी अस्पृश्य मुलींची पहिली शाळा काढली. त्यामुळे धर्माभिमानी कर्मठ ब्राम्हणांच्या दृष्टीने हा अतिशय गंभीर गुन्हा होता. ज्योतिबा हा समाजाचा शत्रु आहे नीच जातीत जन्मलेला ज्योती नीच आहे ज्योतीमुळे पुण्याला कलंक लागला आहे. परंतु म. फुले ब्राम्हणांच्या धमक्याला घाबरले नाहीत. त्यांनी त्यांचे कार्य नेटाने सुरुच ठेवले. म. फुल्यांना त्यांच्या ब्राम्हण मित्राच्या वरातीत अपमानीत केल्यामुळे आपल्या हजारो शुद्र आणि अशिक्षीत बांधवांना शिक्षित करण्याचा विडाच म. फुल्यांनी उचलला होता त्यांनी ब्राम्हणी वर्चस्व झुगारुन दिले.

पाणीमात्रा नेत्रे निर्मिकाने दिली || पाहू ती लागली || एकमेका ||१|| धृ

ज्ञान सर्वा दिले सत्य शोधण्याला || मागी लावण्याला || अज्ञान्यास ||२|| निर्मिकाचा धर्म सत्य आहे एक || भांडणे अनेक || कशासाठी ||३|| मानवानो तुम्ही ईशा नित्य भ्यावे || सर्व सुखी व्हावे || ज्योती म्हणे ||४||

म. फुल्यांनी ज्ञानाचा महिमा सत्य शोधण्यासाठी गायला. शिक्षणाचे महत्व म. फुल्यांनी बहुजनांना समजावून सांगतांना ज्ञान हे सत्य शोधण्यासाठी महत्वाचे हत्यार आहे.

शिक्षणाशिवाय बहुजनांची उन्नती अशक्य आहे. शिक्षणामुळे मनुष्याला सत्य-असत्य काय हे कळून येते. तो सारासार विचार करतो. पुणे महाविद्यालयाचा पर्यवेक्षक मेजर कैडी यांनीही पुढील मत व्यक्त केले. "शाळेतील मुलींची बुध्दीमत्ता आणि प्रगती पाहून मला फार समाधान झाले". म. फुल्यांच्या शिक्षणातील योगदानाबद्दल 'बोर्ड ऑफ एज्युकेशन तथा शिक्षा मंडळी' चे अध्यक्ष नामदार जॉन वर्डेन हे होते. त्यांनी मुंबईतल्या बक्षीस समारंभाच्या वेळी ज्योतिबांच्या पहिल्या दोन शाळांचा उल्लेख कौतुकाने करीत म्हटले, "मी जेव्हा प्रथम न्यायालयाचा आयुक्त म्हणून गेलो होतो, त्यावेळी पुणे शहरात स्थान झालेल्या मुलींच्या शाळांना भेट दिली होती. ज्युच्या भयामुळे वरच्या मजल्यावर दरवाजे बंद करुन ख्रिश्चन लोकांच्या शाळा आरंभी आरंभी चालत, त्याची आठवण मला ही शाळा पाहून झाली. त्या शाळेची शिक्षिका एक माळयाची पत्नी असे. आपल्या देश बांधवांचे केविलवाने अज्ञान दुर करुन त्यांचा उध्दार करण्यासाठी स्वतःच्या पत्नीने सहाय्य करावे म्हणून माळयाने तिला शिक्षण दिले होते. माझ्या देखत तिने मुलींना काही प्रश्न विचारावेत म्हणून मी तिचे मन मोठ्या प्रयत्नाने वळवू शकलो. तेथेच काही तरुण आणि विवाहित स्त्रीयांना प्रशिक्षण द्यायला वर्ग चालू होता, त्या वर्गाला मात्र मला कोणत्याही अटीवर भेट घेऊ दिली नाही" अशा प्रकारे इंग्रज अधिकारी म. फुल्यांच्या शाळेचे गुणगान गात व समाजोध्दाराचे कार्य करणारे दाम्पत्य किती कष्ट घेतात ते कौतुकाने सांगत होते.

छत्रपती राजर्षी शाहू:

दि.१७ मार्च १८८४ रोजी छत्रपती शाहू महाराजांचे दत्तक विधान झाले आणि महाराणी आनंदीबाई यांनी दत्तक पुत्र घेतल्याचे जाहिर केले. छत्रपती शाहू महाराजांच्या कार्याबद्दल विठ्ठल रामजी शिंदे यांनी पुढील उदगार काढले.

"शाहू राजा नुसता मराठा नव्हता, ब्राम्हणेत्तरही नव्हता, तो नवयुगातला सर्वांगपुर्ण राष्ट्रपुरुष होता". ०२ एप्रिल १८९४ रोजी त्यांचा राजाभिषेक विधी झाला. शाहू महाराजाच्या अधिकार प्राप्तीच्य वेळी इतर लोकांप्रमाणे टिळकांनी आपल्या शुभेच्छा व्यक्त करतांना, "करवीर क्षेत्री राजकीय कपिलाष्टमीचा योग" या अग्रलेखात म्हटले की, हिंदूत्वाचा योग्य अभिमान बाळगून त्यांच्या अभ्युदयोकरिता निष्काम बुध्दीने आपला देह झिजविणे हे कोल्हापूर महाराजांचे कुलवृत्त आहे व ते पाळण्यास श्रीमंत शाहू छत्रपती महाराजास ईश्वर सुबूध्दी, धैर्य आणि दिर्घायुष्य देवो व महाराजांस त्याप्रमाणे यशप्राप्ती होऊन त्यांचा सदैव सारखा उत्कर्ष होवो अशी आजच्या मंगल प्रसंगी प्रार्थना करुन हा स्वल्प अभिनंदनपर लेख येथे थांबवितो".

लोकहितवादी गोपाळराव देशमूख यांनी सन १८४८ मध्ये आपल्या "शतपत्रा" त म्हटले आहे की, "ब्राम्हणाशिवाय अन्य वर्गाने विद्या करु नये अशी समजूत आहे. परंतू एखादा मराठा अगर इतर जातीचा कारकून ब्राम्हणांनी पाहिला की, त्यांच्या अंगाचे तिळपापड होतात". राजषी शाहू महाराजांनी प्रारंभी दोन वर्षात अनेक लोककल्याणकारी निर्णय घेतले. ते पुढीलप्रमाणे होत.

१) वेठबिगारी पध्दत बंद केली.

२) कोल्हापूर स्टेशनजवळ "शाहूपूरी" ही वसाहत वसविली.

३) गुळाची नविन बाजारपेठ सुरु केली.

४) राजाराम कॉलेजमध्ये पदवीपर्यंत शिक्षण मिळण्याची व्यवस्था केली.

५) डोंगराळ व आदिवासी लोकांना राज्याच्या सेवेत घेतले.

६) भास्करराव जाधव व ब्राम्हणेत्तर तरुणांची असिस्टंट सरसुभे या पदावर नियुक्ती केली.

वेदोक्त प्रकरण:

वेदोक्त प्रकरण हे राजषी शाहूंच्या जीवनात तसेच आधुनिक महाराष्ट्राच्या सामाजिक व धार्मिक सुधारणा चळवळीत महत्वाचे आहे. या प्रकरणामुळे पुरोहित शाहीची समाजावरील पकड ढिली झाली. त्या संदर्भात न.र. फाटक "या प्रकरणामुळे सत्यशोधक चळवळ जिवंत ठेवली. वेदोक्ताच्या वादात विविध मतप्रवाह होते. लेले, शास्त्री, लो. टिळक, कृष्णानंद सरस्वती, भारताचार्य वैद्य, दिवेकर शास्त्री, घुले शास्त्री यांच्या वेदोक्ता बाबतच्या भूमिका भिन्न होत्या. तसेच सयाजीराव गायकवाड, राजी शाहू महाराज यांचे पाठीराखे सत्यशोधक यांच्याही वेदोक्ता बाबतच्या दृष्टिकोनात फरक होता. वेदोक्त प्रकरणी टिळकांनी शाहूला विरोध केल्यामुळे या वादास राजकीय रंग प्राप्त झाला. इंग्रज अधिकाऱ्यांनी या प्रकरणी हस्तक्षेप करुन शाहूंना अनुकूल निर्णय दिले. या वेदोक्त प्रकरणामुळे महाराष्ट्राचे राजकारण व समाजकारण अनेक वर्षे गढूळ होते.

याबाबत धनंजय कीर लिहितात, "टिळकांच्या वेदोक्तावरील संकुचित व अनुदार मते प्रतिपादन करणाऱ्या 'केसरी' तील अग्रलेखामुळे ब्राम्हणेत्तरात मोठा असंतोष निर्माण झाला. त्यामुळे महाराष्ट्राचे राजकीय व सामाजिक वातावरण अनेक वर्षे दुषित राहीले. टिळकांनी वेदोक्त प्रकरणी चुकीचा पवित्रा घेऊन महाराष्ट्र ब्राम्हण-ब्राम्हणेत्तरात अशा दोन गटात विभागून टाकला".

वेदोक्त प्रकरणाचे मुळ हिंदूच्या विषमताधिष्ठीत समाजव्यवस्थेत असल्याचे आपणास दिसून येते. वेदोक्त प्रकरणामुळे छत्रपती शाहू महाराजांना आतोनात त्रास झाला. ब्राम्हणांनी त्यांचा खूप छळ केला. तरीही छत्रपती शाहू महाराज डगमगले नाहीत आणि सामाजिक परिवर्तनाचे कार्य नेटाने पुढे चालू ठेवले. त्याचबरोबर अस्पृश्योध्दाराचे कार्यही त्यांनी चालूच ठेवले. शिक्षणाच्या बाबतीत छत्रपती

शाहू महाराजांनी जास्त काळजी वाहीली. अस्पृश्यासाठी त्यांनी वसतिगृहाची सोय केली.

कोल्हापूर वसतिगृहाची जननी

इ.स. १८९७ साली दुष्काळ पडला. त्यामुळे राजर्षी शाहूंनी सर्व जाती-धर्मांच्या विद्यार्थ्यांना एक वसतिगृह काढले. दुष्काळामध्ये बहुजनासाठी शिक्षण आणि जेवणाची सोय केली. सर्व जाती-धर्मांच्या विद्यार्थ्यांसाठी एकूण २३ बोर्डींग काढल्या. त्या पुढीलप्रमाणे -

१) व्हिक्टोरिया मराठा बोर्डींग - १९०१

२) दिगंबर जैन बोर्डींग - १९०१

३) विरशैव लिंगायत बोर्डींग - १९०७

`आदिवरुन छत्रपती शाहू महाराजांनी विविध जातीसाठी अलग अलग वसतिगृह काढले. कारण एकाच वसतिगृहात अस्पृश्यता पाळली जाऊ लागली.

सक्तीचे मोफत व प्राथमिक शिक्षण

शाळेचे कार्यवाहक मोरो विठ्ठल वाळवेकर यांनी १६ डिसेंबर १८५३ या दिवशी एक हर्ज मुंबईचे राज्यपाल नामदार व्हायकाऊंट फॉकलंड यांच्याकडे केला. त्यात त्यांनी लिहिले होते, "महार आणि मांग यांच्या शाळेची अत्यंत केविलवाणी परिस्थिती लक्षात घेऊन सुमारे दीडशे मुलगे आणि शंभर मुली यांना बसावयास पुरेल एवढी शाळेची इमारत बांधण्यासाठी राज्यपालांनी आर्थिक सहाय्य करावे आणि पुण्याच्या जिल्हाधिकाऱ्याकडून ते शाळागृह बांधण्यासाठी योग्य असा जमिनीचा तुकडा द्यावा अशी प्रार्थना आहे".

त्यामुळे राज्यपालाने तोफखान्याकडील जमिनीचा तुकडा देण्यास मान्यता दिली तसेच जिल्हाधिकाऱ्याने १८५४ मध्ये इमारत बांधण्यास पाच हजार रु. द्यावेत असे लिहिले. परंतु ब्राम्हणी विचारसरणीचे अधिकाऱ्यांनी ती रक्कम शेवटपर्यंत मिळू दिली नाही. म. फुल्यांचे शुद्र अतिशुद्रांच्या कल्याणाचे कार्य अत्यंत तळमळीचे होते.

त्यांना दारिद्रयातून बाहेर काढण्याचे त्यांचे किती आटोकाट प्रयत्न होते हे यावरुन आपणास दिसून येते.

२ एप्रिल १८९४ रोजी छत्रपती शाहू महाराजांनी राज्यकारभाराची सुत्रे हाती घेतली. कोल्हापूर संस्थानामध्ये प्राथमिक शाळा २२४ होत्या तर विद्यार्थी १५ हजार होते. संस्थानच्या एकूण उत्पन्नापैकी ३.७५% शिक्षणावर खर्च होत असे. यात जास्त उच्चवर्णीयच शिक्षण घेत असत.

१) शिक्षण हे वरिष्ठ वर्गाकडून खालच्या वर्गाकडे झिरपत जाईल. हा सिध्दांत म. फुले प्रमाणे छत्रपती शाहूंना मान्य नव्हता.

२) २५ जुलै १९१७ रोजी प्राथमिक शिक्षण सक्तीचे व मोफत करण्याचा निर्णय घेतला. गाव तेथे शाळा उपक्रम राबविला.

राजर्षी शाहू व अस्पृश्योध्दार:

राजर्षी शाहू गादीवर आले तेव्हा (१८९४) कोल्हापूर संस्थानमध्ये महार, मांग, ढोर, चांभार या अस्पृश्यांची संख्या १ लाख एवढी होती. त्यांनी अस्पृश्योध्दारासाठी पुढील पावले उचलली.

१) छत्रपती शाहू महाराज सत्तेवर आले तेव्हा अस्पृश्यांसाठी ५ शाळा होत्या. १९१७ मध्ये त्यांची संख्या २७ वर नेली.

२) अस्पृश्यांसाठी खाजगी खर्चातून ३ व दरबारी खर्चातून ४ अशी एकूण ७ वसतिगृहे चालविली.

३) अस्पृश्यांना फी माफीची सवलत दिली.

४) प्रत्येक अस्पृश्य विद्यार्थ्यास ५ रु. शिष्यवृत्तीची योजना सुरु केली.

अशा प्रकारे महात्मा फुले, छत्रपती शाहू महाराज आणि डॉ. बाबासाहेब आंबेडकर हे पुरोगामी विचाराचे होते. ब्राम्हण्यवादाला फुले, शाहू, आंबेडकरांनी आजीवन विरोध

केला. त्यामुळेच पुरोगामी महाराष्ट्राची जडण-घडण झाली. त्यात या तीन्ही महामानवाचे मोलाचे योगदान होय.

डॉ. बाबासाहेब आंबेडकर:

डॉ. बाबासाहेब आंबेडकर हे सामाजिक क्रांतीचे मुकूटमणी होते. अखंड भारताच्या २० व्या शतकात या थोर पुरुषांनी महान क्रांतीकारी परिवर्तन घडवून आणले. त्यात डॉ. बाबासाहेब आंबेडकर हे अग्रणी नेते होते. डॉ. बाबासाहेब आंबेडकरांचे कार्य फारच कठिण होते. एका अज्ञानी, गाढ झोपलेल्या समाजाला जागृत करुन हजारो वर्षांचे गुलामीचे जीवन झुगारुन ब्राम्हणी वर्चस्वाविरुध्द अज्ञानी समाजाला संघर्षप्रवण करणे ही म्हणावी तेवढी सोपी गोष्ट नव्हती. बाबासाहेबांना या मुर्दाड झालेल्या समाजबांधवांना अगोदर जागृत करावे लागले. डॉ. बाबासाहेब आंबेडकर म्हणतात, "गुलामाला प्रथम त्याच्या गुलामगिरीची जाणीव करुन द्यावी लागेल त्यानंतर तो बंड करुन उठेल".

डॉ. बाबासाहेब आंबेडकर विषमताधिष्ठीत समाजव्यवस्थेविषयी पुढीलप्रमाणे उदगार काढतात, दि.०३.०२.१९२८ च्या "बहिष्कृत भारत" मध्ये डॉ. बाबासाहेब आंबेडकरांनी म्हटले आहे की, "आम्ही जे मनुस्मृतीचे बाचन केले आहे त्यावरुन आमची खात्री झाली आहे की, त्या ग्रंथात शुद्र जातीची निंदा करणारी, त्यांचा उपमर्द करणारी, कुटाळ उत्पत्तीचा कलंक त्यांच्या माथी मारणारी व त्यांच्या विषयी समाजात अनादर वाढवणारी वचने ओतप्रोत भरलेली आहेत. त्यात धर्माची धारणा नसून असमानतेची धुळवंड घातली आहे".

हिंदू धर्माच्या नावाखाली ब्राम्हणाने राष्ट्राच्या प्रगतीला बाधा आणून राष्ट्राची अधोगती केली. स्रीया, शुध्द, अतिशुद्र, बहुजन समाजाला जवळ-जवळ ८० ते ८५% समाजाला ब्राम्हणाने आपल्या स्वार्थापायी सर्वच अधिकारापासून वंचीत, अज्ञानी ठेवून राष्ट्राची अधोगती केली. बहुजन समाजाला निष्क्रीयतेच्या गर्तेत टाकून राष्ट्रीय उन्नतीत, राष्ट्रीय उत्पन्नाच्या वाटा बंद केल्या. स्वार्थापोटी ब्राम्हणांनी राष्ट्रद्रोह केला हा गुन्हा अक्षम्य होय. म्हणून डॉ. बाबासाहेब आंबेडकरांनी या देशाच्या प्रगतीसाठी जाती विरहित, वर्ग विरहित असा समाज असण्याची आवश्यकता वेळोवेळी प्रतिपादन केली. परंतु हिंदु धर्मातील विषमताधिष्ठीत समाजव्यवस्थेमुळे येथील अस्पृश्यांची अधोगती झाली. या अधोगतीला हिंदू धर्मच जबाबदार आहे अशी आमची खात्री झाली आहे. येथील धर्ममार्तंडांनी पददलितांची केलेली कोंडी पाहून हा अन्यायकारी धर्मच नाकारला पाहिजे या विचारावर ठाम निर्णय झाला असून दि.१३ व १४ ऑक्टोबर १९३५ रोजी येवला जि. नाशिक येथे धर्मांतराची जाहीर घोषणा केली आणि म्हटले की, "आठ कोटी अस्पृश्यांना गुलामगिरीत डांबणारा कोटयावधी बहुजन समाजाला अज्ञान, दारिद्रय व रुढी यांच्या अंधारात दडपणारा आणि असंख्य स्रियांना माणूसकीतून उठवणारा हा धर्म नव्हे. या गुलामगिरीच्या शृंखला आहेत त्या आम्ही आज तोडावयाच्या ठरविल्या आहेत. म्हणून डॉ. बाबासाहेब आंबेडकर म्हणतात की, "स्वातंत्र्य, समता आणि बंधुत्व यावर आधारलेला समाज निर्माण करणे हे माझे ध्येय आहे". या ध्येयाशी ते शेवटपर्यंत चिकटून राहिले. स्वत्व, स्वाभिमान, ध्येयपूर्तता, माणूस, समाज आणि देश यावर ते प्रेम करत जगले, तरच त्या जगण्याला अर्थ आहे, प्रयोजन आहे असे त्यांना वाटे महात्मा फुलं, छत्रपती शाहू, डॉ. आंबेडकरांनी हजारो वर्षच्या विषमतामुलक व्यवस्थेविरुध्द बंड करुन सामाजिक समतेची चळवळ नेटाने चालवली. त्यांच्या क्रांतीकारी कार्यामुळे आजचा पुरोगामी, परिवर्तनशील महाराष्ट्र आपणास दिसून येत आहे.

संदर्भ सूची:

१) रौलिन चेम्ब्लिस १९५४ सोशल थॉट, प्रकाशक
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२) दत्ता कुलकर्णी महात्मा फुले सामाजिक क्रांतीचे
अग्रदूत, प्रकाशक गजेंद्र विठ्ठल सुर्यवंशी, पूणे

३) धनंजय कीर २०११ राजर्षी शाहू छत्रपती प्रकाशक
हर्ष भटकळ, मुंबई

४) संपादक मंडळ डॉ. बाबासाहेब आंबेडकर गौरव ग्रंथ

विकसित भारतासाठी राजकीय भूमिकेचे पाठबळ

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गोषवारा:

भारताने स्वातंत्र्यानंतर विविध सामाजिक, आर्थिक आणि राजकीय टप्पे पार करत आज जागतिक स्तरावर एक महत्त्वाची शक्ती म्हणून स्थान निर्माण केले आहे. पंतप्रधान नरेंद्र मोदी यांनी मांडलेले "विकसित भारत 2047" हे स्वप्न साकार करण्यासाठी केवळ आर्थिक साधनसंपत्ती पुरेशी नसून, त्यासाठी ठाम, दूरदृष्टीपूर्ण आणि लोककल्याणकारी **राजकीय इच्छाशक्ती (Political Will)** अत्यंत आवश्यक आहे. गरीबी निर्मूलन, पायाभूत सुविधांचा विकास, आत्मनिर्भर भारत, सामाजिक समावेशकता, महिला व तरुणांचे सक्षमीकरण, सुशासन आणि प्रभावी परराष्ट्र धोरण या सर्व बाबी राजकीय भूमिकेच्या पाठबळावरच प्रत्यक्षात उतरू शकतात. प्रस्तुत संशोधन निबंधात विकसित भारताच्या संकल्पनेचा अभ्यास करताना, भारताला विकसित राष्ट्र बनविण्यात राजकीय भूमिकेचे महत्त्व, विविध पैलू, आव्हाने आणि संधी यांचा सखोल अभ्यास करण्यात आलेला आहे.

बीजसज्ञा: *विकसित भारत, सुशासन, आत्मनिर्भर भारत.*

प्रस्तावना:

भारत हा जगातील सर्वांत मोठी लोकशाही असलेला देश असून स्वातंत्र्यानंतरच्या सात दशकांत त्याने सामाजिक, आर्थिक व राजकीय क्षेत्रात उल्लेखनीय प्रगती केली आहे. नियोजनबद्ध विकास, हरित क्रांती, औद्योगिकीकरण, उदारीकरण, खाजगीकरण व जागतिकीकरण यांसारख्या विविध टप्प्यांतून भारताची विकासयात्रा पुढे सरकली आहे. आज भारत जागतिक स्तरावर एक उदयोन्मुख शक्ती म्हणून ओळखला जात असून 2047 पर्यंत *विकसित भारत* होण्याचे उद्दिष्ट देशासमोर आहे. मात्र हे उद्दिष्ट केवळ आर्थिक वाढीपुरते मर्यादित नसून सर्वसमावेशक व शाश्वत विकासाशी संबंधित आहे.

विकसित भारताची संकल्पना उच्च जीवनमान, गुणवत्तापूर्ण शिक्षण व आरोग्य सेवा, आधुनिक पायाभूत सुविधा, सामाजिक न्याय, रोजगारनिर्मिती, सुशासन व राजकीय स्थैर्य या घटकांवर आधारित आहे. हे सर्व घटक प्रभावीपणे प्रत्यक्षात आणण्यासाठी ठाम, दूरदृष्टीपूर्ण आणि लोकाभिमुख **राजकीय इच्छाशक्ती (Political Will)** अत्यंत आवश्यक ठरते. धोरणनिर्मिती, कायद्यांची अंमलबजावणी, प्रशासनावर नियंत्रण आणि विकास प्रक्रियेला योग्य दिशा देण्याचे कार्य राजकीय नेतृत्वाच्या माध्यमातूनच घडून येते.

गरीबी निर्मूलन, आत्मनिर्भर भारत, महिला व तरुणांचे सक्षमीकरण, सामाजिक समावेशकता, भ्रष्टाचारमुक्त शासन आणि प्रभावी परराष्ट्र धोरण या क्षेत्रांतील यश

राजकीय भूमिकेवर मोठ्या प्रमाणावर अवलंबून आहे. त्यामुळे विकसित भारताचे स्वप्न साकार करण्यासाठी राजकीय इच्छाशक्ती ही एक निर्णायक घटक ठरते. प्रस्तुत संशोधन निबंधात विकसित भारताच्या संकल्पनेचा अभ्यास करताना, भारताला विकसित राष्ट्र बनविण्यात राजकीय भूमिकेचे महत्त्व व योगदान यांचे सखोल विश्लेषण करण्यात आले आहे.

विकसित भारताची संकल्पना:

विकसित भारत ही संकल्पना केवळ आर्थिक समृद्धीपुरती मर्यादित नाही. ती एक **बहुआयामी संकल्पना** आहे. विकसित राष्ट्राची काही महत्त्वाची वैशिष्ट्ये पुढीलप्रमाणे आहेत:

- उच्च प्रतीचे जीवनमान
- गुणवत्तापूर्ण शिक्षण व आरोग्य व्यवस्था
- आर्थिक स्थैर्य व रोजगार निर्मिती
- सामाजिक न्याय व समावेशक विकास
- प्रगत पायाभूत सुविधा
- सुशासन व पारदर्शक प्रशासन
- आंतरराष्ट्रीय स्तरावर प्रभावी स्थान

डॉ. ए.पी.जे. अब्दुल कलाम यांनी "इंडिया 2020" या पुस्तकात भारत महासत्ता होण्यासाठी आवश्यक असलेले घटक स्पष्ट केले आहेत. त्यामध्ये राजकीय नेतृत्वाची भूमिका केंद्रस्थानी आहे.

संशोधनाची उद्दिष्टे:

1. विकसित भारताच्या संकल्पनेचा अभ्यास करणे.
2. विकसित भारतासाठी राजकीय भूमिकेचे महत्त्व स्पष्ट करणे.
3. विविध क्षेत्रांतील राजकीय इच्छाशक्तीचे योगदान अभ्यासणे.

4. भारतासमोरील आव्हाने आणि संधींचा आढावा घेणे.

संशोधनाची गृहीतके:

1. विकसित भारतासाठी राजकीय इच्छाशक्ती अत्यंत महत्त्वाची आहे.
2. आत्मनिर्भर भारत आणि आर्थिक धोरणे ठरविण्यात राजकीय भूमिकेचे मोलाचे योगदान आहे.
3. सामाजिक सक्षमीकरणात भारतीय राजकीय नेतृत्वाची भूमिका प्रभावी आहे.
4. राजकीय स्थैर्य आणि सुशासनासाठी भारतीय राजकीय व्यवस्था आग्रही आहे.

विकसित भारतासाठी राजकीय भूमिकेचे मुख्य पैलू दूरदृष्टी आणि धोरणात्मक नेतृत्व:

विकसित राष्ट्र घडवण्यासाठी राजकीय नेतृत्वाकडे स्पष्ट ध्येय, दीर्घकालीन दृष्टी आणि दूरदृष्टीपूर्ण धोरणे असणे अत्यंत आवश्यक आहे. केवळ तात्कालिक राजकीय लाभांवर आधारित निर्णय न घेता भविष्यातील पिढ्यांचा विचार करून धोरणे आखली गेली पाहिजेत. भारताला 2047 पर्यंत विकसित राष्ट्र बनवण्याचे उद्दिष्ट हे अशाच दूरदृष्टीचे प्रतीक आहे. शिक्षण, आरोग्य, विज्ञान-तंत्रज्ञान, नवोन्मेष, संशोधन आणि कौशल्य विकास या क्षेत्रांवर विशेष भर देण्यात येत आहे. दूरदृष्टीपूर्ण राजकीय नेतृत्व शिक्षण व्यवस्थेचे आधुनिकीकरण करून मानवी संसाधन विकासावर भर देते. आरोग्य क्षेत्रात सार्वत्रिक आरोग्यसेवा, डिजिटल हेल्थ, आणि प्राथमिक आरोग्य सुविधा मजबूत करण्यासाठी धोरणात्मक निर्णय घेतले जात आहेत. विज्ञान व तंत्रज्ञानाच्या माध्यमातून भारताला ज्ञानाधिष्ठित अर्थव्यवस्थेकडे नेण्याचा प्रयत्न सुरू आहे. मात्र, ही सर्व

धोरणे प्रभावीपणे अंमलात आणण्यासाठी ठाम राजकीय इच्छाशक्ती आवश्यक असते. इच्छाशक्तीच्या अभावामुळे अनेक चांगली धोरणे कागदावरच मर्यादित राहतात. म्हणूनच विकसित भारतासाठी दूरदृष्टीपूर्ण नेतृत्व हे केवळ मार्गदर्शक नसून विकास प्रक्रियेचे इंजिन ठरते. सक्षम राजकीय नेतृत्वामुळेच राष्ट्राला योग्य दिशा, स्थैर्य आणि विश्वासार्हता प्राप्त होते.

पायाभूत सुविधांचा विकास:

पायाभूत सुविधांचा विकास हा कोणत्याही देशाच्या आर्थिक प्रगतीचा कणा मानला जातो. रस्ते, महामार्ग, रेल्वे, मेट्रो, विमानतळ, बंदरे आणि डिजिटल कनेक्टिव्हिटी यांचा विकास उद्योग, व्यापार आणि रोजगारनिर्मितीस चालना देतो. भारतासारख्या विकसनशील देशासाठी पायाभूत सुविधा मजबूत करणे हे विकसित राष्ट्र होण्याच्या दृष्टीने अत्यंत महत्त्वाचे आहे. अलीकडील काळात भारतात मोठ्या प्रमाणावर पायाभूत सुविधांमध्ये गुंतवणूक करण्यात येत आहे. *भारतमाला* योजनेअंतर्गत राष्ट्रीय महामार्गांचे जाळे विस्तारले जात आहे, तर *सागरमाला* योजनेद्वारे बंदरविकास आणि सागरी व्यापाराला चालना दिली जात आहे. *स्मार्ट सिटी* योजनेमुळे शहरी भागात आधुनिक नागरी सुविधा निर्माण होत आहेत. डिजिटल इंडिया उपक्रमामुळे इंटरनेट कनेक्टिव्हिटी, ई-सेवा आणि डिजिटल व्यवहार सर्वसामान्यांपर्यंत पोहोचले आहेत. हे सर्व विकास उपक्रम राजकीय इच्छाशक्तीशिवाय शक्य नाहीत. मोठ्या प्रकल्पांसाठी धोरणात्मक निर्णय, निधीची तरतूद, प्रशासकीय समन्वय आणि दीर्घकालीन बांधिलकी आवश्यक असते. त्यामुळे पायाभूत सुविधांचा विकास हा विकसित भारतासाठी राजकीय भूमिकेचा एक महत्त्वाचा पैलू ठरतो.

आत्मनिर्भर भारत आणि आर्थिक धोरणे:

आत्मनिर्भर भारत ही संकल्पना भारताच्या आर्थिक स्वातंत्र्याशी निगडित आहे. देशांतर्गत उत्पादन वाढवणे, स्थानिक उद्योगांना प्रोत्साहन देणे आणि आयातीवरील अवलंबित्व कमी करणे हा आत्मनिर्भरतेचा मुख्य उद्देश आहे. विकसित भारतासाठी मजबूत, स्थिर आणि समावेशक अर्थव्यवस्था आवश्यक असून ती केवळ ठाम आर्थिक धोरणांमुळेच शक्य होते. *मेक इन इंडिया* उपक्रमामुळे उत्पादन क्षेत्राला चालना मिळाली असून भारताला जागतिक उत्पादन केंद्र बनवण्याचा प्रयत्न सुरू आहे. *स्टार्ट-अप इंडिया* मुळे तरुण उद्योजकांना संधी मिळत असून नवोन्मेष आणि रोजगारनिर्मितीला गती मिळत आहे. *ईज ऑफ डुईंग बिझनेस* सुधारणा केल्यामुळे गुंतवणूक आकर्षित होत आहे. या सर्व धोरणांचा पाया म्हणजे राजकीय नेतृत्वाने घेतलेले धाडसी आणि निर्णायक निर्णय. आर्थिक सुधारणांमध्ये अनेकदा राजकीय धोके असतात, मात्र दीर्घकालीन विकासासाठी हे निर्णय आवश्यक असतात. आत्मनिर्भर भारत ही संकल्पना केवळ आर्थिक नसून ती राष्ट्रीय आत्मविश्वास आणि स्वाभिमानाशी संबंधित आहे. त्यामुळे विकसित भारतासाठी आत्मनिर्भरतेचे स्वप्न साकार करण्यामध्ये राजकीय इच्छाशक्तीची भूमिका अत्यंत निर्णायक ठरते.

सामाजिक सक्षमीकरण:

विकसित भारतासाठी सामाजिक न्याय आणि समावेशक विकास हा अत्यावश्यक घटक आहे. समाजातील प्रत्येक घटक विकास प्रक्रियेत सहभागी झाला नाही तर विकास अपूर्ण ठरतो. महिला, युवक, अनुसूचित जाती-जमाती, अल्पसंख्याक आणि दिव्यांग यांचे सक्षमीकरण करणे हे राजकीय नेतृत्वाचे महत्त्वाचे कर्तव्य आहे. *बेटी बचाव, बेटी पढाव* योजनेमुळे मुलींच्या

शिक्षणाला प्रोत्साहन मिळाले आहे. *उज्ज्वला योजना* मुळे ग्रामीण आणि गरीब महिलांना स्वच्छ इंधन उपलब्ध झाले आहे. *मुद्रा योजना* द्वारे लघु व सूक्ष्म उद्योजकांना आर्थिक पाठबळ मिळाले आहे. युवकांसाठी कौशल्य विकास कार्यक्रम राबवून त्यांना रोजगारक्षम बनवण्यावर भर दिला जात आहे. या सर्व योजनांमुळे सामाजिक विषमता कमी करण्यास मदत होत आहे. मात्र अशा योजनांची प्रभावी अंमलबजावणी करण्यासाठी राजकीय इच्छाशक्ती आणि प्रशासकीय दक्षता आवश्यक असते. सामाजिक सक्षमीकरणामुळेच लोकशाही अधिक बळकट होते आणि विकसित भारताचा पाया मजबूत होतो.

राजकीय स्थैर्य आणि सुशासन:

राजकीय स्थैर्याशिवाय कोणताही देश शाश्वत विकास साध्य करू शकत नाही. सततचे राजकीय बदल, अस्थिरता आणि धोरणांतील अनिश्चितता विकास प्रक्रियेत अडथळे निर्माण करतात. त्यामुळे विकसित भारतासाठी स्थिर आणि सक्षम राजकीय व्यवस्था आवश्यक आहे. सुशासन म्हणजे पारदर्शक, उत्तरदायी आणि भ्रष्टाचारमुक्त प्रशासन. *डिजिटल गव्हर्नन्स, DBT, ई-गव्हर्नन्स* यांसारख्या उपक्रमांमुळे प्रशासन अधिक लोकाभिमुख आणि कार्यक्षम झाले आहे. थेट लाभ हस्तांतरणामुळे मधल्या दलालांची भूमिका कमी झाली असून जनतेचा शासनावरचा विश्वास वाढला आहे. कायद्यांची प्रभावी अंमलबजावणी, प्रशासकीय सुधारणा आणि नैतिक राजकारण यामुळे सुशासन साकार होते. राजकीय इच्छाशक्ती असल्यासच हे सर्व शक्य होते. त्यामुळे राजकीय स्थैर्य आणि सुशासन हे विकसित भारतासाठी अत्यंत महत्त्वाचे स्तंभ ठरतात.

परराष्ट्र धोरण:

विकसित भारतासाठी प्रभावी आणि संतुलित परराष्ट्र धोरण अत्यंत महत्त्वाचे आहे. जागतिकीकरणाच्या युगात कोणताही देश एकटा प्रगती करू शकत नाही. आर्थिक हितसंबंधांचे संरक्षण, आंतरराष्ट्रीय व्यापार, गुंतवणूक आणि सुरक्षा या सर्व बाबी परराष्ट्र धोरणाशी निगडित आहेत. भारताने अलीकडच्या काळात जागतिक पातळीवर आपली भूमिका अधिक ठळकपणे मांडली आहे. शेजारी राष्ट्रांशी मैत्रीपूर्ण संबंध, बहुपक्षीय संस्थांमध्ये सक्रिय सहभाग आणि जागतिक शांततेसाठी योगदान यामुळे भारताची प्रतिमा मजबूत झाली आहे. *बहुकेंद्री लोकशाही* आणि आंतरराष्ट्रीय सहकार्याचा पुरस्कार भारताच्या परराष्ट्र धोरणाचे वैशिष्ट्य आहे.

राजकीय नेतृत्वाने घेतलेले धोरणात्मक निर्णय भारताच्या आर्थिक व सामरिक हितांचे रक्षण करतात. त्यामुळे विकसित भारतासाठी परराष्ट्र धोरण हा राजकीय भूमिकेचा एक अत्यंत महत्त्वाचा पैलू ठरतो.

महाराष्ट्राची भूमिका:

विकसित भारताच्या स्वप्नात महाराष्ट्राची भूमिका अत्यंत महत्त्वाची आहे. औद्योगिक, शैक्षणिक, कृषी आणि सेवा क्षेत्रात महाराष्ट्र अग्रगण्य राज्य आहे. मुंबई ही देशाची आर्थिक राजधानी असून राज्याचा राष्ट्रीय उत्पन्नात मोठा वाटा आहे. औद्योगिक विकास, आयटी, स्टार्ट-अप्स, कृषी सुधारणा आणि पायाभूत सुविधांमध्ये महाराष्ट्राने महत्त्वाची कामगिरी केली आहे. राज्यस्तरीय राजकीय नेतृत्वाने घेतलेले निर्णय राष्ट्रीय धोरणांवर प्रभाव टाकतात. शैक्षणिक संस्था, संशोधन केंद्रे आणि औद्योगिक कॉरिडॉर यामुळे महाराष्ट्राचा विकास भारताच्या एकूण प्रगतीला चालना देतो. म्हणूनच विकसित भारतासाठी महाराष्ट्राचे नेतृत्व आणि राजकीय भूमिका ही प्रेरणादायी व मार्गदर्शक ठरते.

आव्हाने:

विकसित भारताचे स्वप्न साकार करताना भारतासमोर अनेक गंभीर सामाजिक, आर्थिक व प्रशासकीय आव्हाने उभी आहेत. या आव्हानांवर प्रभावीपणे मात केल्याशिवाय शाश्वत व समावेशक विकास साध्य करणे कठीण आहे. यामध्ये लोकसंख्या वाढ, बेरोजगारी, आर्थिक विषमता, भ्रष्टाचार आणि प्रशासकीय अकार्यक्षमता ही प्रमुख आव्हाने मानली जातात. लोकसंख्या वाढ हे भारतासमोरील सर्वात मोठे आव्हान आहे. वाढती लोकसंख्या शिक्षण, आरोग्य, रोजगार व पायाभूत सुविधांवर मोठा ताण निर्माण करते. जर ही लोकसंख्या कुशल व उत्पादक नसेल तर ती विकासासाठी अडथळा ठरते. त्यामुळे लोकसंख्येला *लोकशक्ती* मध्ये रूपांतर करण्यासाठी ठोस धोरणांची गरज आहे. बेरोजगारी ही आर्थिक व सामाजिक अस्थिरतेस कारणीभूत ठरणारी समस्या आहे. विशेषतः तरुणांमध्ये वाढणारी बेरोजगारी ही गंभीर बाब असून रोजगारनिर्मितीला चालना देण्यासाठी औद्योगिकीकरण, स्टार्ट-अप्स आणि कौशल्य विकासावर भर देणे आवश्यक आहे.

आर्थिक विषमता ही समावेशक विकासातील मोठी अडचण आहे. समाजातील काही घटक समृद्ध होत असताना मोठा वर्ग अजूनही मूलभूत सुविधांपासून वंचित आहे. ही दरी कमी करण्यासाठी सामाजिक न्यायाधारित धोरणे आवश्यक आहेत. भ्रष्टाचार आणि प्रशासकीय अकार्यक्षमता यांमुळे विकास योजनांची प्रभावी अंमलबजावणी होत नाही. त्यामुळे पारदर्शक, उत्तरदायी आणि कार्यक्षम प्रशासनाची आवश्यकता आहे. या सर्व आव्हानांवर मात करण्यासाठी मजबूत, प्रामाणिक आणि दूरदृष्टीपूर्ण **राजकीय इच्छाशक्ती** ही अत्यंत आवश्यक ठरते. मजबूत राजकीय नेतृत्वाशिवाय विकसित भारताचे स्वप्न साकार होऊ शकत नाही.

निष्कर्ष:

वरील विवेचनावरून पुढील निष्कर्ष काढता येतात:

1. विकसित भारत घडवण्यासाठी राजकीय भूमिकेचे पाठबळ निर्णायक आहे.
2. आर्थिक धोरणे आणि आत्मनिर्भर भारतासाठी राजकीय इच्छाशक्ती मार्गदर्शक ठरली आहे.
3. सामाजिक सक्षमीकरणात राजकीय नेतृत्वाने मोलाचे योगदान दिले आहे.
4. सुशासन आणि पारदर्शक प्रशासनामुळे विकसित भारताचे स्वप्न साकार होऊ शकते.

योग्य वेळी योग्य राजकीय पाठबळ मिळाल्यास भारताला विकसित राष्ट्र होण्यापासून कोणीही रोखू शकत नाही.

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