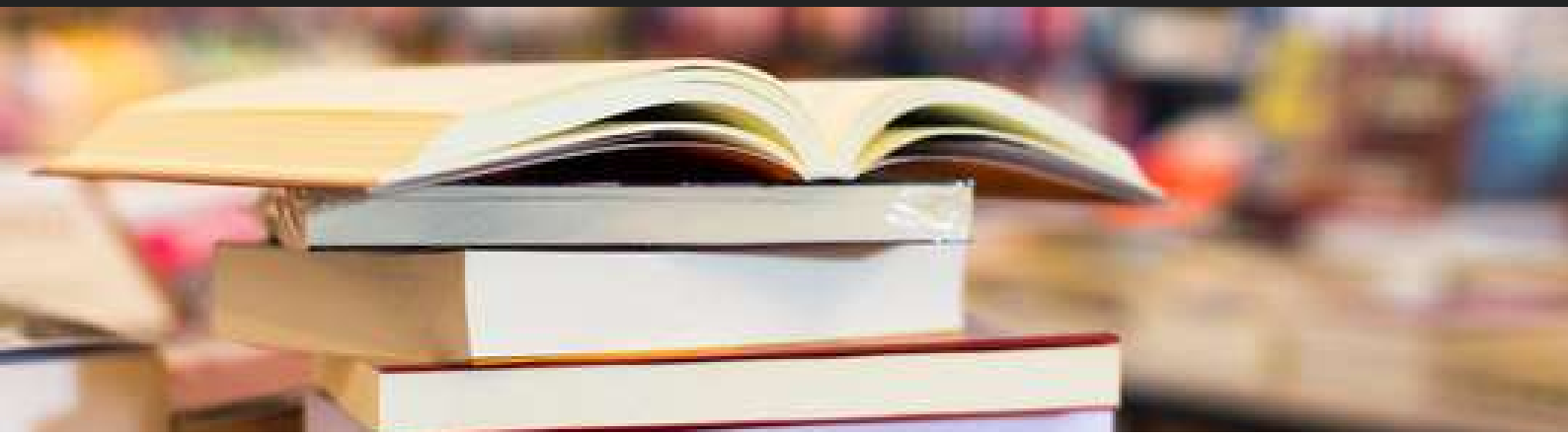
ISSN: 3065-7865

BULLETIN OF NEXUS

MARCH 2026, VOLUME-3, ISSUE-3(II)

Double-blind peer-reviewed /refereed, open access online International journal

Chief Editor
Dr. F. M. Nadaf



ISSN: 3065-7865 MARCH 2026, VOLUME-3, ISSUE-3(II)

DOUBLE-BLIND PEER-REVIEWED /REFEREED, OPEN ACCESS ONLINE INTERNATIONAL JOURNAL



BN
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BN
2024
MULTIDISCIPLINARY
INTERNATIONAL RESEARCH JOURNAL

Publisher
Royal International Global LLC

JOURNAL PARTICULARS

Name of Journal	Bulletin of Nexus
Frequency	Monthly (Jan to Dec)
e-ISSN	3065-7865
Publisher	Royal International Global LLC 16192 Coastal Highway, County of Sussex, Lewes, Delaware 19958 USA
Chief Editor	Dr. F. m. Nadaf
Copy right	Royal International Global LLC
Starting Year	October 2024
Subject	Multi-Disciplinary
Review Process	Double Blind Review Process
Language	English
Publication Format	online
Access	Open Access
License	Creative Commons Attribution 4.0 International
Phone No.	(+1) 3023033026
Email	bulnexus@gmail.com
Journal Website	https://bnir.us
Registered office Address	CEO Royal International Global LLC 16192 Coastal Highway, County of Sussex, Lewes, Delaware 19958 United States of America (USA)
Admin. Office Address	CEO Royal International Global LLC 16192 Coastal Highway, County of Sussex, Lewes, Delaware 19958 United States of America (USA)

Bulletin of Nexus

(International Multidisciplinary Research Journal)

ISSN: 3065-7865
Volume-3, Issue-3(II), March 2026
Publication Language – English
Periodicity of Publication- Monthly
Website: https://bnir.us Email: bulnexus@gmail.com

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PUBLISHER
Royal International Global LLC
16192 Coastal Highways, County of Sussex, Lewes, Delaware 19958
United States of America (USA)
Email: ceo@royaligllc.us Website: https://royaligllc.us Mob: Mob: (+1) 3023033026

Index

Sr. No.	Paper Title	Page No.
1	Patents And Their Role in Promoting Innovation and Economic Development **Dr. Seema Rajendra Dabhade (Chavan)**	1-5
2	Spices In a Foreign Plate from India **Vidya Shrihari Garud**	6-10
3	Role of Indian Economy in Industrial Sustainable Development in Nation **Dr. Ajinath Maruti Doke**	11-14
4	To Study of The Impact of Digital Commerce in Achieving Viksit Bharat 2047. **Kamthe Pratik.A, Dr.Ghorpade N. L**	15-17
5	Water Security and Sustainable Development challenges to Viksit Bharat: A Case Study of Maharashtra and India **Shital Ravindra Bavaskar**	18-23
6	A Comprehensive Study of Business Startup Initiatives in India: Policy Support, Comparative Analysis and Emerging Challenges **Kale Nilam Nivrutti**	24-29
7	Role of AI In Enhancing Digital Payment Security **Gavhale Pooja Balasaheb**	30-34
8	Artificial Intelligence and Machine Learning: Applications, Challenges and Future Scope **Yogita Ravsaheb Rahane**	35-38
9	Determinants and Outcomes of Digital Governance Adoption in Charitable Trusts **Swapnil Sunil Ghule**	39-42
10	Impact of E-Commerce on Consumers Approach **Dhanashree S. Divate, Vitthal D. Kadus**	43-50
11	Environmental Issue **Kavita Ashok Kotkar**	51-55
12	Research and Development in Indian Universities: Opportunities and Challenges for Startup Creation **Aruna Devram Mudawat**	56-58
13	Agricultural Policies and their Impact on Farmers in Maharashtra **J. A. Shaikh**	59-64
14	A Comparative study on Startup and Innovation expenses budget by Government of India **Mahale Santosh Abasaheb**	65-68
15	Tourism And Rural Development: Study of Bhansahivara Fort, Tal. Newasa, Dist. Ahmednagar (Maharashtra) **Rahul G. Nipunge, Dr. Kishor G. Dhanwate**	69-72
16	A Study on Future Trends Forecasts for E-Commerce **Zoje Neha Siddharth**	73-79
17	Digital Banking and Financial Inclusion in Rural India	80-82

	Virendra Aher	
18	Innovation and Institutional Support for Agri-Export Organizations: A Study of Pune Division **Pankaj Ganesh Jagtap**	**83-85**
19	Make in India: Reconfiguring India's Manufacturing Trajectory for Sustainable Economic Growth Gaurishankar M.Dama	**86-89**
20	A Study on the Role of Higher Education in Addressing Emerging Trends in the Banking and Finance Sector **Labade Yogesh Rajabapu**	90-94
21	Innovating Finance for Research and Start-ups: Challenges and Opportunities in Maharashtra's Banking Sector 2026 **Zoting Asmita Ashok**	95-100
22	Challenges Of Poultry Farming in The Ahilyanagar District of Maharashtra, India **Dattatraya Ramnath Waghmare, Dr. Rajendra Sitaram Pawar**	**101-106**
23	The Interplay Between Higher Education, Innovation and Start-Up Ecosystem in India **Ritanjali Swain**	**107-109**
24	Digital Marketing and Business Growth in India: Opportunities, Challenges and Future Prospects **Pawar Babasaheb Devram, Dr. Argade Sanjay Laxman**	**110-112**
25	Transition of Consumer Preference from Conventional to Organic Food Products with special reference to Satara and Karad City **Dr. Suvarna Ashok Kurkute**	**113-116**
26	To Study on Strategic Leadership **Kaveri, Sachin Jadhav**	**117-121**
27	Heavy Metal Pollution in Water: Sources, Toxicity and Remediation Techniques **Dr. Vishal A. Naik, Kajal R. Gaikwad, Mrugaya S. Thakur**	**122-126**
28	Geopolitical Conflict in West Asia and its Implications for India's Energy Policy **T. Y. Randive**	**127-130**
29	Higher Education and Sustainable Entrepreneurship: Promoting Innovation and Startups in the Cold Pressed Oil Sector in Daund and Baramati Taluka **Preeti Rajesh Watharkar**	**131-133**
30	Digital Marketing: Trends, Challenges and Future Prospects **Bangar Moresh Kamalakar**	**134-137**
31	A Study of Industrial Development and employee **Rajashri Yadav Sawant, Dr. Vaishali M. Deshpande**	**138-140**
32	Role of Higher Education in Promoting Research, Innovation, Startups, and Intellectual Property Rights: A Conceptual Study **Arun Parasram Kadam**	**141-143**
33	The Role of Business Administration in Enhancing Organizational Efficiency and Growth in the Modern Economy	**144-146**

	Ajay Ramesh Gaikwad	
34	The Role of Higher Education Institutions in Advancing Research, Innovation, and Fintech Entrepreneurship in the Banking and Finance Sector **Deepak Pandurang Tambade**	**147-149**
35	Role of Cyber security in Protecting Modern Business Organizations **Pravin Dashrath Gaikwad, Rutuja Dhanraj Shendkar**	**150-154**
36	Linking Higher Education, Innovation and Start-up Development: A Commerce Perspective **Karhe Prakash Sukhadev,Nitin Baban Shende**	**155-160**
37	Profitability Analysis of Bank of Maharashtra **Dr. Kishor Baburao Jadhav**	**161-166**
38	The Impact of IPR Awareness on the Market Valuation of Academic Startups in Maharashtra (2026) **Asmita Ashok Zoting**	**167-173**
39	Ethical AI and Governance: A Commerce-Centric Synthesis of Principles, Standards, and Corporate Stewardship **Preeti Suraj Naik,Dr. Sharmila Kavedia**	**174-177**
40	Design and Development of a Real-Time Power BI Dashboard for Tractor Sales, Competitor Analysis, and Market Trend Prediction **Pooja R. Patil, Shreya A. Patil**	**178-185**
41	India's Holistic Development Path: Vikasit Bharat 2047 **Jadhav Parikshit Shatrughan**	**186-188**
42	Effect of Digital Payment Systems on Consumer Behaviour in Maharashtra **Arun Parasram Kadam**	**189-192**
43	E - Waste Management **A. S. Nikam, A. S. Gangurde, V. P. Kadam, K. N. Pawar**	**193-196**

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Patents And Their Role in Promoting Innovation and Economic Development

Dr. Seema Rajendra Dabhade (Chavan)
Asso. Prof. Department of Economics, S.S.G.M. College, Kopargaon Dist.: Ahilyanagar

Manuscript ID:
BN-2026-030301

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 1-5

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839342
DOI link:
https://doi.org/10.5281/zenodo.20839342

Abstract

Patents are an important component of the intellectual property rights (IPR) system that encourages innovation and technological advancement. A patent is an exclusive legal right granted to inventors for a limited period, usually 20 years, allowing them to control the use, production, and commercialization of their inventions. The patent system provides incentives for researchers, entrepreneurs, and organizations to invest in research and development activities. In the modern knowledge-based economy, innovation plays a key role in economic growth, industrial development, and global competitiveness. Countries that promote strong intellectual property protection systems tend to experience higher levels of technological progress and economic expansion. According to recent global intellectual property statistics, approximately 3.7 million patent applications were filed worldwide in 2024, reflecting a steady increase in global innovation activities. Major economies such as China, the United States, Japan, and South Korea dominate global patent filings due to their strong research infrastructure, technological capabilities, and supportive innovation policies. Patents not only encourage technological inventions but also promote technology transfer, attract foreign investment, and support industrial competitiveness. This research paper examines the concept of patents, their importance in promoting innovation, global trends in patent applications, and their contribution to economic development. The study concludes that a well-structured patent system plays a crucial role in fostering innovation, strengthening industries, and promoting sustainable economic growth.

Keywords: *Patents, Intellectual Property Rights, Innovation, Technology Development, Economic Growth.*

Introduction

Innovation has become the driving force of modern economic development. In the global knowledge economy, technological progress and scientific discoveries significantly influence productivity, competitiveness, and industrial development. Countries that encourage innovation and protect intellectual property rights are able to achieve sustainable economic growth.

Intellectual Property Rights (IPR) include various forms of protection such as copyrights, trademarks, industrial designs, geographical indications, and patents. Among these, patents play a particularly important role because they protect technological inventions and encourage investment in research and development.

A patent grants exclusive rights to inventors for a specified period, generally 20 years, allowing them to prevent others from using, manufacturing, or selling their inventions without authorization. This exclusivity provides inventors with an opportunity to recover research costs and earn profits from their innovations.

The patent system also contributes to the diffusion of knowledge because inventors are required to disclose the technical details of their inventions. This disclosure allows other researchers and innovators to learn from existing technologies and develop further innovations.
In recent decades, the number of patent applications has increased rapidly due to globalization, digital transformation, and increasing investments in scientific research. Governments across the world are strengthening intellectual property laws to encourage innovation and attract technological investments.

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Address for correspondence:
Dr. Seema Rajendra Dabhade (Chavan), Asso. Prof. Department of Economics, S.S.G.M. College, Kopargaon Dist.: Ahilyanagar
Email:

How to cite this article:
Dabhade (Chavan), S. R. (2026). Patents And Their Role in Promoting Innovation and Economic Development. Bulletin of Nexus Journal, 3(3(II)), 1–5. https://doi.org/10.5281/zenodo.20839342

Quick Response Code:

Website: https://bnir.us

Statement of the Problem

In today's competitive global economy, innovation and technological development are essential for economic progress. However, innovators often face challenges in protecting their inventions from imitation or unauthorized use.

Without proper legal protection, inventors may lose the economic benefits of their discoveries. This discourages individuals and companies from investing time and resources in research and development activities.

Although patent systems exist in most countries, many developing economies face difficulties such as:

- Lack of awareness about intellectual property rights
- High cost of patent filing and maintenance
- Complex legal procedures
- Limited access to research infrastructure

Therefore, it becomes necessary to study the role of patents in promoting innovation and economic development and to analyze the global trends and challenges associated with patent systems.

Objectives of the Study

1. To understand the concept and meaning of patents.
2. To study the importance of patents in promoting innovation.
3. To analysis global trends in patent applications.
4. To study the relationship between patents and economic development.
5. To identify major challenges in the patent system.
6. To suggest policy measures for strengthening patent protection.

Research Methodology

Research methodology refers to the systematic process used to conduct the research study. The present research is descriptive and analytical in nature and focuses on examining the role of patents in promoting innovation and economic development.

The study is mainly based on secondary data, which has been collected from reliable sources such as international intellectual property reports, research journals, books, government publications, and reports of organizations like WIPO, OECD, and the World Bank**.**

The collected data related to patent applications, innovation trends, and leading countries in patent filings were analysed using tables and simple statistical methods**.** Graphs and comparative analysis were also used to understand global trends in patent activity and their relationship with economic development.

Concept and Meaning of Patents

A patent is a legal right granted by the government to an inventor for a specific period, usually **20 years**, which provides exclusive rights to make, use, sell, or distribute an invention. The main purpose of a patent is to protect inventions and encourage innovation by rewarding inventors for their creative work.

To obtain a patent, an invention must satisfy three essential conditions: novelty, inventive step, and industrial applicability. Novelty means the invention must be new, inventive step means it should involve creativity and not be obvious, and industrial applicability means it should be useful and capable of being used in industry.

Patents are generally granted for technological inventions such as machinery, pharmaceuticals, electronics, and industrial processes. An important feature of the patent system is that inventors must disclose the details of their inventions, which helps in the spread of knowledge and further technological development.

Importance of Patents

Patents play a significant role in promoting innovation, protecting intellectual property, and supporting economic development. By granting exclusive rights to inventors, patents encourage individuals, research institutions, and companies to invest in research and development activities. This leads to the creation of new technologies, products, and industrial processes. Patents also provide legal protection to inventors by preventing unauthorized use or copying of their inventions, ensuring that innovators receive recognition and financial benefits for their work. In addition, patents facilitate technology transfer through licensing agreements and collaboration between organizations, which helps in spreading technological knowledge across industries and countries. Companies with patented technologies also gain a competitive advantage in the market, enabling them to strengthen their position in the industry. Thus, patents contribute to technological advancement, industrial growth, and overall economic progress.

Global Trends in Patent Applications

The global patent landscape has witnessed rapid growth in recent years due to technological advancements and increased R&D investments.

According to international intellectual property statistics, global patent filings reached 3.7 million applications in 2024, representing a 4.9% increase from 2023.

The growth in patent filings has been driven primarily by emerging economies such as China and India, as well as developed economies like the United States and Japan.

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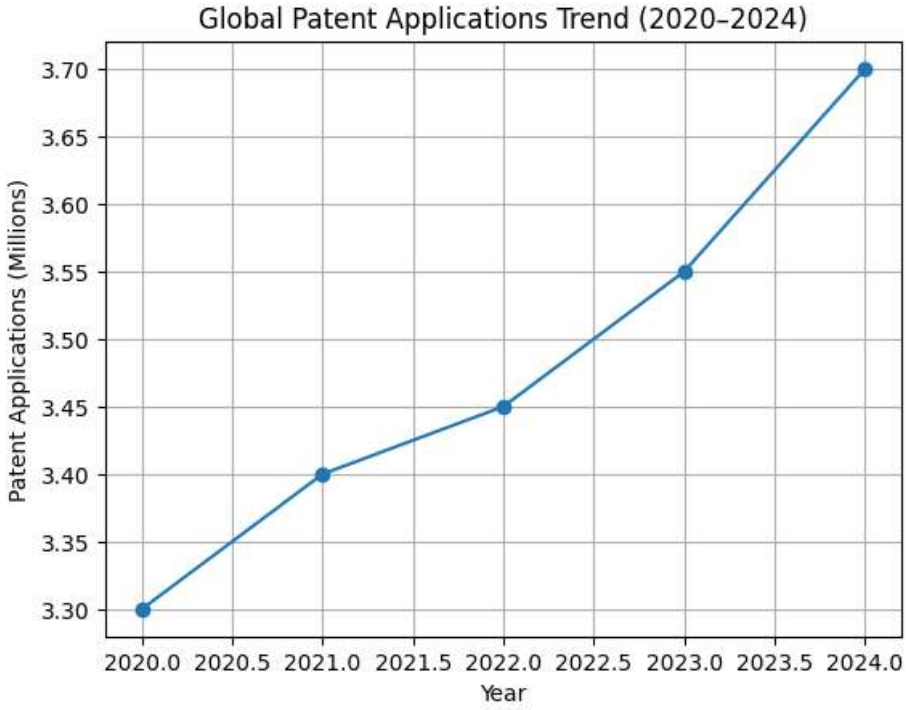
Table 1 Global Patent Applications (2020–2024)

Year	Patent Applications (Million)
2020	3.30
2021	3.40
2022	3.45
2023	3.55
2024	3.70

Graph 1:
(Create a line graph showing increasing patent applications from 2020–2024)



Leading Countries in Patent Filings

Patent activity varies significantly across countries depending on their level of technological development, research investment, and innovation policies.

Recent global data shows that China leads the world in patent filings, followed by the United States, Japan, South Korea, and Germany.

Table 2

Top Countries by Patent Applications (2024)

Rank	Country	Patent Applications
1	China	1,800,000
2	United States	501,831
3	Japan	419,132
4	South Korea	300,000+
5	Germany	180,000+

China accounts for nearly half of the global patent filings, reflecting its strong investment in research and innovation.

Graph (Create a bar chart showing patent applications by country)

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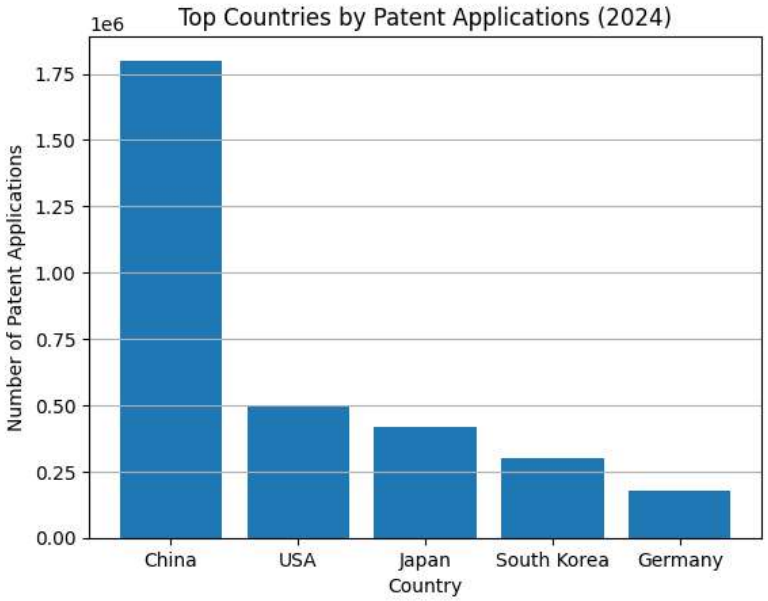

Patents and Economic Development

Patents contribute significantly to economic development by encouraging innovation, improving productivity, and supporting industrial growth.

Research has shown that countries with higher patent activity often experience faster economic growth because innovation leads to new products, improved technologies, and increased competitiveness.

Patents also attract foreign investment because investors prefer countries with strong intellectual property protection systems. Companies are more likely to invest in research and technology development in environments where their innovations are protected.

Additionally, patents support the development of high-technology industries such as artificial intelligence, biotechnology, renewable energy, and telecommunications.

Importance of Patents

1. **Encouraging Innovation:**
   Patents encourage inventors and companies to develop new ideas and technologies. By granting exclusive rights over inventions, patents motivate researchers to invest time and resources in research and development activities.
2. **Economic Growth:**
   Patents contribute to economic development by promoting technological progress and industrial growth. Innovative industries create employment opportunities and increase productivity in the economy.
3. **Protection of Intellectual Property:**
   Patents provide legal protection to inventors by preventing others from copying or using their inventions without permission. This ensures that innovators receive recognition and financial benefits from their work.
4. **Technology Transfer:**
   Patents facilitate the transfer of technology through licensing agreements and collaboration between companies, universities, and research institutions. This helps in spreading new technologies across industries and countries.
5. **Competitive Advantage:**
   Companies that own patents gain a competitive advantage in the market because they can protect their technologies and maintain leadership in their industries.

Policy Implications

An effective patent system requires strong government policies and supportive institutional mechanisms that promote innovation and protect intellectual property rights. Governments should strengthen intellectual property laws and ensure their proper implementation so that inventors receive legal protection for their inventions. It is also important to simplify the patent filing process and reduce procedural complexities so that individual inventors, researchers, and small enterprises can easily apply for patents. In addition, governments should encourage research and development activities by providing financial support, tax incentives, and grants to research institutions and industries. Support for start-ups and small businesses is also essential because they often face financial and technical difficulties in obtaining patents. Furthermore, collaboration

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between universities, research institutions, and industries should be promoted to increase innovation and technology commercialization. International cooperation in intellectual property protection can also strengthen the global patent system and facilitate the exchange of advanced technologies. These policy measures can help create a favorable environment for innovation, technological progress, and sustainable economic development.

Conclusion

Patents play a vital role in promoting innovation, technological advancement, and economic development in the modern knowledge-based economy. By granting exclusive rights to inventors, patents provide incentives for individuals and organizations to invest in research and development activities. This leads to the creation of new technologies, improved products, and increased industrial productivity.

The global patent system has expanded significantly over the past few decades, reflecting the growing importance of innovation in economic growth. Countries such as China, the United States, Japan, and South Korea have emerged as leaders in patent filings due to their strong research infrastructure and innovation policies.

Patents not only protect intellectual property but also encourage technology transfer, attract foreign investment, and enhance global competitiveness. However, the patent system also faces several challenges such as high costs, complex procedures, patent disputes, and limited access to technology.

To maximize the benefits of the patent system, governments must adopt effective policies that encourage innovation while maintaining fair competition and accessibility. Strengthening intellectual property laws, promoting research and development, supporting start-ups, and enhancing international cooperation can significantly improve the effectiveness of patent systems.

Overall, a well-balanced and efficient patent system is essential for fostering innovation, supporting industrial growth, and achieving sustainable economic development in the global economy.

Acknowledgment

I would like to express my sincere gratitude to everyone who supported and guided me in completing this work on *Patents and Their Role in Promoting Innovation and Economic Development*.

First and foremost, I am deeply thankful to my teachers and mentors for their invaluable guidance, constant encouragement, and insightful suggestions throughout the course of this study. Their knowledge and expertise greatly contributed to the successful completion of this work.

I would also like to acknowledge the contributions of researchers, scholars, and authors whose published works on intellectual property and patents have provided essential insights and a strong foundation for this study.

My heartfelt thanks go to my friends and peers for their support, motivation, and constructive feedback, which helped me improve and refine my work.

Finally, I am profoundly grateful to my family for their unwavering support, patience, and encouragement throughout this journey. Their belief in me has been a constant source of strength and inspiration.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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10. Sampat, B. (2018). Patents, innovation, and public policy. *Journal of Economic Perspectives*.

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Spices In a Foreign Plate from India

Vidya Shrihari Garud
Research Scholar, Savitribai Phule Pune University Dept. Of Economics

Manuscript ID:
BN-2026-030302

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 6-10

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839400
DOI link:
https://doi.org/10.5281/zenodo.20839400

Abstract-

India ranks higher when it comes to the production of spices, but we are unable to maximize the utilization of these crops compared to other nations. Price fluctuations are seen in both domestic and foreign markets for the prices of spices. Along with other important spices, very little research has been done on the production and export performance of seed spices like coriander and cumin. Spice production will be enhanced by the examination of growth rates and instability in terms of area, production, yield, and exports.

Export obstacles were identified through the documentation of export promotion programs and restrictions on the export of the main Indian spices. In order to meet the demands of both domestic and foreign markets, the current study assists producers, scientists, and policymakers in developing suitable policies to improve spice production and export. The data imitate a ***solidification of the spices sector in India****, driven not only by development in cultivated area but also by* ***enhancements in production****. The slight dip in 2024–25 should not be seen as a negative trend but rather as a* ***short-term adjustment****, especially since production remains relatively high.*

Introduction-

India is the largest producer, consumer, and exporter of spices in the world. Around 75 out of 109 spices listed by ISO are produced in India. Major spice-producing states are Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana, Rajasthan, Gujarat, and Madhya Pradesh. Major exported spices are Chilli, Cumin, Turmeric, Cardamom, Pepper, Spice oils & oleoresins**.** USA**,** China**,** Vietnam**,** Bangladesh**,** UAE**,** Malaysia**,** UK are the major countries where India exports its spices**.**

India exported 1.8 million tons of spices and spice-related items in 2020–2021, worth USD 4178.80 million. By volume, India accounts for 45–50% of the global spice trade, and in terms of value, the proportion of spice exports to all agricultural exports rose to 10.3% in 2019–2020. Over the past 20 years, there have been notable shifts in the pattern of spice exports, with black pepper revenues falling to less than 5% and chilies and cumin emerging as the main export commodities among spices. During 2020–2021, the demand for ginger and turmeric due to their ability to improve immunity during the COVID epidemic resulted in the largest amount and value of these spices being shipped. (V. Shrinivasan et al.,2023) Since the beginning of human history, spices have been intimately associated with magic, cultural customs, preservation, medicine, and embalming. In addition to textiles and perfumes, spices played a significant role in India's external trade with Mesopotamia, China, Sumeria, Egypt, and Arabia long before the Greek and Roman civilizations, around 7000 years ago.

Writings from the Roman Empire in the first century AD and the Ramayana both refer to cloves. In the past, fleets of camels were frequently transported from Calicut, Goa, and the Orient to far-off places like Carthage, Alexandria, and Rome in order to deliver these spices. In the past, individuals would risk their lives to obtain Indian spices, but nowadays, they are easily accessible. This drew commerce and invaders for centuries.

Even though many spices originated in India, it was challenging and dangerous to source different kinds of spices from that country. It required embarking on the protracted and challenging sea expeditions and enduring fierce competition from other great empires hoping to control the spice trade.

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Address for correspondence:
Vidya Shrihari Garud, Research Scholar, Savitribai Phule Pune University Dept. Of Economics
Email - Vidyashrihari4.Vg@Gmail.Com

How to cite this article:
Garud, V. S. (2026). Spices In a Foreign Plate from India. Bulletin of Nexus Journal, 3(3(II)), 6–10. https://doi.org/10.5281/zenodo.20839400

Quick Response Code:

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Between the seventh and fifteenth centuries, Arab traders brought Indian spices to the West, but they were careful to maintain the privacy of their source.

It is well known that they have disseminated fantastical tales to pique interest, safeguard their market, deter rivals, and raise prices. In contrast, the Europeans used their ships to embark on protracted explorations in an attempt to discover the real source of the spices that gave their cuisine its flavor. Indian spices were even more expensive than gold at the time, and they were in high demand and hard to find. Another estimate states that throughout the late Middle Ages, Western Europe imported about 1,000 tons of pepper and 1,000 tons of other common spices per year. In terms of value, these spices were equal to 15 lakh people's yearly grain supply. India has a long history of commerce with the ancient civilizations of China and Rome and is renowned as the origin of spices. Owing to their remarkable flavor, texture, and perfume, Indian spices are the most sought-after in the world. The world's largest spice market, both domestically and internationally, is found in India. The nation produces over 65 different types of spices out of the 109 that the International Organization for Standardization (ISO) has specified. India's diverse climate offers plenty of room for the production of a wide range of spices. Nearly every state in India grows spices, and the total area under cultivation is estimated to be 3.15 million hectares. In the global spice trade, India holds a strong position. 10,28,060 tons of spices and spice-related items worth about 17,929.55 crore (US$ 2,781.46 million) were exported by India in 2017–18. The volume and value of exports increased by 8% and 6%, respectively, in US dollars. Regarding the intended exports, the actual result was 100% in volume and 105% in value expressed in dollars.

Most Indian spices are exported to Vietnam, which is followed by Malaysia, the United States, Saudi Arabia, the United Arab Emirates, and the United Kingdom. India's biggest spice export by value is chilli, which is followed by cumin, turmeric, coriander, mint products, and spice oils and oleoresins.

India is a major producer of a wide range of oleoresins and spice oils from different grades of spices. India has been effectively producing and exporting value-added spice products to numerous nations worldwide for a long time. The Indian spice industry has developed over time into a market-driven, customer-focused, quality-conscious, and technology-led sector.

A wide range of value-added spices are now produced in bulk, in brine, and in consumer packs (natural food colouring, curry mixes, spice extracts, mint oils, and other spice-based industrial raw materials) in powdered, cracked, crushed, blended, and dehydrated forms as a result of this progression. Indian oleoresins and spice oils still control a large portion of the worldwide processed food sector.

Literature Review-

Veeranagouda et al. (2011) conducted a study on the growth rate of Chilli in Northern Karnataka. Nilanjana Kumari (2012) The study analyzed the relationship between exports and these indicators through Karl Pearson's coefficient of correlation and multiple correlation methods. Srinivas Rao (2012) conducted an analysis of the export of Indian spices, focusing on their growth rate and instability. Yogesh and Mokshyapathy (2013) conducted a study on the production and export performance of Black Pepper. The current study indicated a significant increase in spice production in India, as evidenced by the rise in area from 2005 hectares in 1991-92 to 2,629 hectares during 2008-09. Joshi et al. (2014) conducted a stability analysis regarding the direction of spice trade from India. To achieve this, they employed the Markov chain (MC) concept to examine the dynamics of spice exports to various countries worldwide. Joshi and Singh (2015) conducted a study on the growth and instability in the area, production, and productivity of spices in India. Their findings indicated that spices experienced positive and significant growth across all sub-periods, except for pepper, which showed negative yet significant growth in area, production, and yield during sub-period III (2001-2013). Ganesan (2015) conducted a study on the growth and instability of turmeric production, focusing on area, production, and yield across selected states in India. The study also computed and analyzed the components of change in average production and variance of production through decomposition analysis.

Research gap

Relatively, there are several studies that have been done on the export of Indian spices, but this study will give a recent analysis of the major spices of the area under cultivation, exports, and production.

Objectives

- To study the performance of specific spices' exports.
- To determine the elements affecting the export of particular Indian spices.
- To study the area under cultivation of spices.

Methodology-

The study took into account the major Indian states that grow the principal spices—black pepper, fenugreek, turmeric, ginger, coriander, cumin, and

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chilli. The largest area under agriculture was used to produce the major crops.

Hypothesis

- spices are performing well in terms of exports.
- Both price and non-price factors affect the production and export of spices.

Statement Of the Problem

Research on the global export performance of different general-consumption products has been unnecessary. Both the producing and the consuming nations throughout the world are thought to gain from these. This category comprises domestic utilities, food, and beverages. Even though this particular produce is not well-known for its typical benefits, it has a higher monetary value. In any economy's development process, exports have taken on a significant role. For a growing nation like India to achieve quick growth, a minimum amount of foreign exchange is required. India's spice exports are predicted to exceed US$3 billion by 2016–17 (Spices Board, 2016) due to excellent distribution networks, inventive packaging, imaginative marketing methods, and superior quality.

The Indian spices market is worth Rs 40,000 crore (US$ 5.87 billion) a year, with 15% of that amount coming from the branded segment. With a 46% volume and 23% value share in the global spice market, India is the world's top producer, user, and exporter. India is the world's largest fruit producer, with over 80 value-added goods and about 50 entire spices in its export basket (Spices Board, 2016). The Indian spice sector is primarily dependent on exports for its viability. Many developing nations are now fierce competitors of India.

Need for the study

In several nations, exporting agricultural commodities is subject to a number of rules. As a result of these regulations, shipments of spices have decreased. As a result of the decline in spice output, there are welfare losses in nations that export spices. In the event of unemployment, welfare losses include a decline in foreign revenue, unfavourable terms of trade, and a loss of government revenue. Furthermore, this situation raises poverty rates and reduces social welfare services, which may cause unrest among the populace. For this reason, it is crucial to understand trends in spice export performance as they can help assess the type of impact and its social and political ramifications. This study aimed to determine trends in spice export performance from 2001–02 to 2023-24.

Data

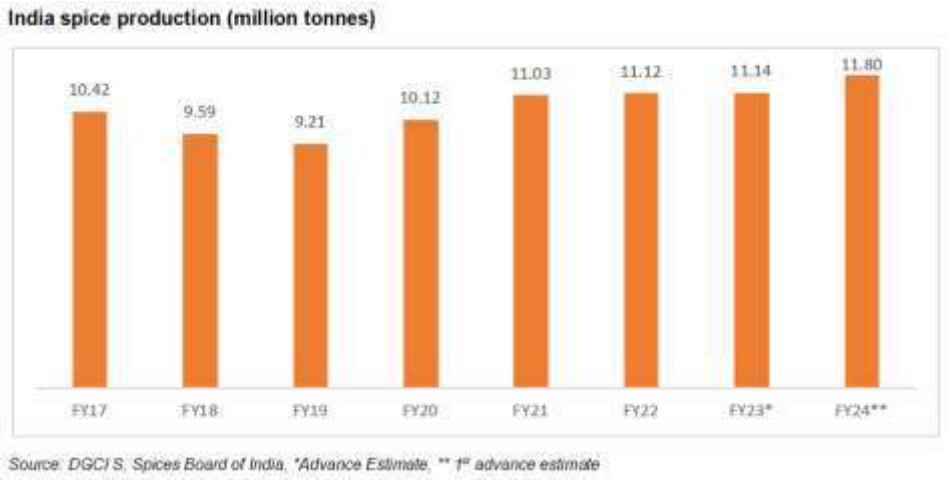
This study is based on secondary data collected from various sources. Like annual reports, brochures, and websites of the Indian Spices Board, Ministry of Commerce, Government of India, are sources of secondary data.

Table1.1

Year	Total Area (Hectares)	Total Production (Metric Tonnes)
2020–21	4,483,580	11,043,488
2021–22	4,388,858	11,149,913
2022–23	4,544,253	11,827,483
2023–24 (Final)	5,056,599	12,483,215
2024–25 (Advance Estimate)	4,686,713	11,995,594

Source: other spices: State Agri/Hort. Departments/DASD Kozhikode

Graph 1.1





*Note: *- Until July 2025*

Source: DGCI&S, RBI, NIRYAT

During 2021 and 2025, India's spice sector showed stable growth, with cultivated area rising from **4.41 to about 4.7 million hectares**, production rising from **10.87 to about 11.5 million tonnes**, and exports increasing in both **volume and value**, crossing **₹36,000 crore in export earnings**.

It was anticipated that 12 million metric tons of spices would be produced in FY24. In contrast, 11.14 million tonnes were produced in FY23, up from 11.12 million tonnes in FY22. India's spice exports increased to US$4.52 billion in FY25 from US$4.24 billion in FY24.

With a value of US$1,508.94 million, chilli was the most popular spice exported from India in FY24. Cumin came in second at US$700.23 million, and spice oils and oleoresins at US$498.01 million. Turmeric, curry powders/paste, and mint products were other important exports that significantly increased India's spice export output.

The biggest exporter of spices and spice-related goods is India. The nation exported $4.72 billion worth of spices in FY25. India exported spices valued at Rs. 13,301 crores. Exports of chili, cumin, turmeric, and ginger totalled 0.71, 0.22, 0.17, and 0.13 million tons for FY25. In contrast, during FY 26, exports of chilli, cumin, turmeric, and ginger recorded 0.27, 0.07, 0.63, and 0.05 million tons. In comparison to FY24, the value and volume of exports of turmeric, coriander, garlic, curry powder, and other spices, including asafoetida and tamarind, increased in FY25.

The area under cultivation of spices is gradually increasing. Table 1.1 shows the trend in **total area under spice cultivation** and **total production in India** from 2020–21 to 2024–25. There is no perfectly linear relationship between area and production.

First, observing at the **area**, it slightly declined from 4.48 million hectares in 2020–21 to 4.38 million hectares in 2021–22. After that, there was a steady rise, peaking at 5.06 million hectares in 2023–24, followed by a noticeable drop to 4.69 million hectares in 2024–25 (advance estimate).

Now, for **production**, the trend is generally rising. Production increased from 11.04 million tonnes in 2020–21 to a peak of 12.48 million tonnes in 2023–24. However, in 2024–25, production declined slightly to about 11.99 million tonnes.

Production shows steady growth due to better varieties and irrigation. **Exports are** increasing mainly due to demand for **turmeric, cumin, and chilli.**

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this work on *Spices in a Foreign Plate from India*.

First and foremost, I am deeply thankful to my teachers and mentors for their constant guidance, valuable insights, and encouragement throughout this project. Their support helped me better understand the cultural and historical significance of Indian spices across global cuisines.

I would also like to acknowledge the contributions of authors, historians, and culinary experts whose works provided essential knowledge and inspiration for this study. Their research has been instrumental in shaping my understanding of how Indian spices have influenced food traditions worldwide.

My sincere thanks go to my friends and peers for their encouragement, helpful suggestions, and motivation during the course of this work.

Finally, I am immensely grateful to my family for their continuous support, patience, and belief in me,

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which made it possible to complete this project successfully.

Financial support and sponsorship
Nil.

Conflicts of interest
The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Role of Indian Economy in Industrial Sustainable Development in Nation

Dr. Ajinath Maruti Doke
Assistant Professor, Department of Commerce, PDEA's Annasaheb Magar Mahavidyalay, Hadapsar, Pune (MH-INDIA)

Manuscript ID:
BN-2026-030303

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 11-14

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839433
DOI link:
https://doi.org/10.5281/zenodo.20839433

Abstract

The role of financial management in sustainable development is very important in India's industrial development. Although the Indian economy and Digital India are closely linked, inclusive and sustainable development plays a key role in it. In developing and mixed-economy democracies like India, it is the need of the hour to encourage entrepreneurs to invest and collaborate to increase environmentally friendly productivity and create employment. India's industrial development should not be balanced but should become a foundation for automation and growth. India's dependence on industrial inputs has decreased and the share of the government sector has increased. When considering the economic progress of different countries at the global level, a classification of developed, developing and underdeveloped countries is seen.

Key words: *Financial Management, Industry, Development, Sustainable, Policy, Income, Entrepreneurship, Process, Economy etc.*

Introduction:

The role of the industrial sector in the development of the developed countries of the world is very important. Developed countries have achieved great progress through industrialization. The role of the industrial sector is considered very important for any country. India is a developing economy. Therefore, industrialization plays a very important role in achieving economic development in India. During the British rule, India was used as a trading post. It was a one-way British policy to take raw materials from India to England and then industrially process those materials and sell the final products produced in the Indian market. Therefore, during the British rule, India did not have a very conducive environment for industrialization. Due to this British policy, India was known as an industrially backward nation after independence.

Problems of the Study:

India is a developing economy. The Indian economy is known as a rural economy. Therefore, the role of the industrial sector on both sides is an important aspect in the Indian economy. One is that the development of most businesses in the rural areas depends on the development of the industrial sector and the other is that the role of the industrial sector is of utmost importance in making the country a developed nation. Along with the development of the country's industrial sector, a conducive environment will be created for the development of various sectors in the country. Therefore, industrialization plays an important role in the economic development of any country.

Objectives of the Study:

The main objective of this research is to study the role and current status of the Indian economy in the industrial sustainable development of the country, and some specific objectives have been given by the researcher as follows.

1. To Study industrial development in India.
2. To Study the role of economy in sustainable development in India.
3. To Study the factors affecting the Indian economy and industrial development.

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Address for correspondence:

Dr. Ajinath Maruti Doke, Assistant Professor, Department of Commerce, PDEA's Annasaheb Magar Mahavidyalay, Hadapsar, Pune (MH-INDIA)
Email: ajinathdoke555@gmail.com

How to cite this article:

Doke, A. M. (2026). Role of Indian Economy in Industrial Sustainable Development in Nation. Bulletin of Nexus Journal, 3(3(II)), 11–14. https://doi.org/10.5281/zenodo.20839433

Quick Response Code:

Website: https://bnir.us

Significance of the Study:

The role of the industrial sector in India's economic development can be explained with the help of the following points. Industries like sugar, textiles, tea, cotton etc. use agricultural products as raw materials. This creates demand for agricultural products. At the same time, the industrial sector supplies the agricultural sector with the necessary tools, machinery, chemicals, seeds, pesticides, etc. In this way, the industrial sector contributes to the development of the agricultural sector.

Scope of the Study:

The population of the country is increasing rapidly day by day. Therefore, along with the increasing population, the demand for consumer goods is also increasing. The country's industrial sector processes raw materials and produces final consumer goods from them and makes them available to the public for consumption. Therefore, the consumption needs of the people of the country are fulfilled by this sector.

Limitation of the Study:

India is rich in various types of natural resources. These available raw natural resources can be utilized efficiently through the industrial sector. Industrialization leads to the exploitation of natural resources. Developing countries are largely dependent on the use of natural resources. The industrial sector can promote economic development through efficient use of natural resources. The development of the industrial sector will create a large number of employment opportunities in the country. Along with the development of the industrial sector, the agricultural sector and the service sector will also develop and more employment will be created.

Period of the Study:

The Indian economy is a key component of the developing Indian economy and plays a key role in the current sustainable development. To achieve industrial development, it is necessary to continue the marketing process by paying a fair price to the produced goods. To conduct this research, the researchers have completed this research based on the information from 2025-26.

Research Methodology:

The role of the economy and the current situation in industrial development in developing India are very closely related. Industrial development in the country provides employment and provides a strong foundation for the economy. The researcher has used many types of secondary research to conduct this research. This includes research papers, articles, newspapers, audio videos, reference books, serial books, annual reports, texts etc.

Research Method:

Sustainable industrial development plays a very important role in developing and democratic countries like India that have adopted mixed economies. But in the current situation, it is important to create employment and eradicate poverty and bring the people below poverty line in the country into the flow of economic development. To conduct this research, the researchers used a descriptive analysis method along with several types of secondary research.

Results and Discussion:

A large number of employment opportunities have been created in the industries of the union and nonunion sectors of the country. The role of the industrial sector in reducing the problem of unemployment by creating employment opportunities in the country is seen as important. To calculate the national income of a country, the market value of all final goods and services produced in a country in a financial year is measured. The growth of national income in the industrial sector of the country is seen. The demand for primary products produced in the agricultural sector on the international market is decreasing day by day. Therefore, if the country's exports are to be increased, it is necessary to diversify exports through the industrial sector.

Industrial Development:

Products manufactured by Indian industries are being exported to various countries. If exports increase, they will help reduce the country's trade deficit and industrial sectors will become important for the exports of developing countries. Due to the underdevelopment of the country's industrial sector and unemployment, a large population density has been created in the rural areas. Therefore, the rate of hidden unemployment is also high. Along with the development of the industrial sector in India, new employment opportunities are being created. Therefore, the surplus population in the rural areas is migrating to urban areas for employment, which has reduced the surplus population density in the rural areas and has also helped in increasing the productivity of the rural areas.

Market Expansion:

Along with the development of the industrial sector, the market also expands and develops. The industrial sector produces various types of goods, thereby expanding the market.

The market for raw materials for industries will develop. The employment generated by the industrial sector will increase the income of the people and thereby create demand for various goods and services.

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Government Policy:

The government revenue will increase significantly from direct and indirect taxes levied by the government on the industrial sector and the various types of products produced by it. The government receives a large amount of revenue from taxes like corporate tax, production tax, goods and services tax and from that income, the government can implement various economic development schemes and projects. Some regions of the country are ahead in development while some regions are lagging behind. Regional integration should be built with the help of the industrial sector. The government of backward regions is making efforts for the development of such regions by providing various facilities and amenities for setting up new industries.

Sustainable Development:

India has a large population living below the poverty line. Efforts are being made to provide employment for the people of the country and raise their standard of living through industrialization. The government is emphasizing poverty alleviation through industrialization. Therefore, the role of the industrial sector is important from the perspective of poverty alleviation in the country.

International Trade:

On an international scale, saying that a country is poor or developing does not necessarily mean that the country has a low per capita income. In order to make the country technologically advanced in time, it is necessary to make efficient use of all the resources available in the country, and this can be achieved through the development of the industrial sector. The role of the industry sector also appears to be important in reducing economic inequality, harnessing technological change, improving the standard of living of the people, promoting investment etc.

Industrial Policy:

The industrial policy of a country is the strategy formulated by the government for the industrial development of the country. The industrial policy of a country includes the rules related to the industrial sector, the means and methods of control, principles, and standards, Industrial finance, labor issues, ownership rights of industries, industrial services and facilities, laws, foreign aid, tax policy etc. In order to attract foreign investment, the Industrial Policy of 1991 allowed foreign investors to invest 51 % or more in Indian industrial companies.

Implementation of Industrial Licensing Policy:

The main basis of the industrial licensing policy is that there should be administrative control over the industry and business in the country. Unnecessary bureaucratic interference in industry has increased through the outdated industrial licensing policy, hindering the development of the country's industrial sector. At the same time, the restrictive conditions of the licensing policy were limiting industrial development. Therefore, fundamental changes in the industrial licensing policy had to be adopted for industrial development. According to the 1991 Industrial Policy, all industries were to be exempted from licensing except for 18 industries that were considered to be economically, environmentally and socially harmful. The infrastructure in the railways has been allowed to be developed by the private sector. Therefore, currently only two areas are reserved for the public sector.

Conclusion:

The Indian economy is a mixed economy. A mixed economy is characterized by the coexistence of the public sector and the private sector. According to the Industrial Policy of 1956, all the important industries in the country were to be under the control of the government. The expectations that were made from the public sector during the planned period could not be fulfilled. The 1991 Industrial Policy was an implicit admission that the public sector had failed in the country's economic development process. According to the policy, the number of reserve industries for public sector was reduced by 8 times. The scope of the public sector was reduced and the number of industries reserved for the public sector was reduced to 3. Therefore, only three sectors, namely nuclear power, nuclear mining and railways, were reserved for the government sector.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this work on *Role of Indian Economy in Industrial Sustainable Development in Nation*.

First and foremost, I am deeply thankful to my teachers and mentors for their valuable guidance, continuous encouragement, and insightful suggestions throughout the preparation of this project. Their expertise helped me understand the relationship between economic growth, industrialization, and sustainable development.

I would also like to acknowledge the contributions of economists, researchers, and scholars whose studies and publications provided important knowledge and a strong foundation for this work.

My heartfelt thanks go to my friends and peers for their support, motivation, and constructive feedback during the course of this project.

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Finally, I express my deepest gratitude to my family for their unwavering support, patience, and encouragement, which enabled me to successfully complete this work.

Financial support and sponsorship
Nil.

Conflicts of interest
The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

To Study of The Impact of Digital Commerce in Achieving Viksit Bharat 2047.

Kamthe Pratik.A[1] Dr.Ghorpade N.L [2]
[1]Assit.Prof. (M.com,GDC &A, PGDBIF.) Annasaheb Mager College Hadapsar, Pune
[2]prin. (M.com,M.phil,B.ed,SET,Phd)Annasaheb Mager College Hadapsar, Pune

Manuscript ID:
BN-2026-030304

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 15-17

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839479
DOI link:
https://doi.org/10.5281/zenodo.20839479

Abstract:

India is seen as a developed country in recent times; the journey from a developed country to a developing country has been brilliant. The most important role played in this journey is the e-commerce of the Indian economy, i.e., buying and selling goods through electronic means. The Prime Minister of India, Shri Narendra Modi, on the occasion of the hundred years of independence, has adopted the vision of transformation of the Government of India to make India a fully developed, self-reliant and developing nation, i.e., Viksit Bharat 2047. The main objective of the policy is to achieve a 3 trillion US dollar GDP reach. In this, the role of e-commerce is crucial and prominent. While studying this role, you realise that e-commerce is the fuel for India's economic growth. Digital transformation is appearing as an essential component for attaining world economic supremacy while India advances toward its aim of Viksit Bharat 2047. By 2029–2030, it is anticipated that the nation's electronic economy would account for nearly five percent of the nation's total income, overtaking industry and agriculture's historical predominance. The digital economy employed 21.07 million individuals and contributed 21.54% of GDP (INR 61.54 lakh crore or USD 602 billion) in 2022–2023.

Key words: *Digital commerce, Growth, Social Transformation, E-Governance, Sustainable Development, Technological Advancement.*

Introduction:

Customers can buy goods and services internet through digital commerce, Digital commerce Known as E-commerce eliminating the necessity for face-to-face communication. It symbolizes an elaborate procedure that goes beyond simple transactions and includes every step of the client journey, from discovery to delivery and after-sale support. To facilitate corporate operations easier, it entails the complete integration of digital channels and technology.

Digital transformation is appearing as an essential component for attaining world economic supremacy while India advances toward its aim of Viksit Bharat 2047. By 2029–2030, it is anticipated that the nation's electronic economy would account for nearly five percent of the nation's total income, overtaking industry and agriculture's historical predominance. The digital economy employed 21.07 million individuals and contributed 21.54% of GDP (INR 61.54 lakh crore or USD 602 billion) in 2022–2023 alone. India is on track to become the global hub for information technology because to financial advancements, AI-driven companies, and digital platforms that promote growth. More financial and online access is also being made possible by the growth of e-commerce, UPI usage, and wireless internet adoption. Nevertheless, in spite of these

Nonetheless, the nation still has a long way to go in closing the digital gap. The gender disparity in internet access is 13%, while the urban-rural digital gap is still significant at 66%, above the worldwide mean of 37%. To sustain long-term growth, targeted actions are also needed to address infrastructural inequities, innovation shortages, and risks related to cybersecurity. To ensure equitable and long-term growth, it will be essential to address these obstacles with strong digital legislation, embrace of artificial intelligence, and digital skilling. Through an analysis of sectoral patterns, state-by-state and global comparisons.

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Address for correspondence:
Kamthe Pratik.A, Assit.Prof. (M.com, GDC&A, PGDBIF.) Anna Saheb Mager College Hadapsar, Pune

How to cite this article:
Kamthe, P. A., & Ghorpade, N. L. (2026). To Study of The Impact of Digital Commerce in Achieving Viksit Bharat 2047. Bulletin of Nexus Journal, 3(3(II)), 15–17. https://doi.org/10.5281/zenodo.20839479

Quick Response Code:

Website: https://bnir.us

The objective of Research as follows:

- To study the role of digital commerce in viksit bharat 2047.
- To identify challenges in achieving viksit bharat 2047.
- To understand opportunities & scope for digital commerce & viksit bharat 2047.

Review of Literature:

According to research, information technology can i ncrease productivity in emerging nations by over 26% through automation as well as information ana lytics, highlighting the economic Effects of digitalization (Lechman & Anacka, 2022).

To guarantee equitable and sustainable progress, researchers say it is essential to address the digital divide, risks to cybersecurity, gaps in digital competence, and environmental problems. India may use digitalization to achieve its goal of becoming a developed country by 2047 through strategic policies, collaboration between the public and private sectors, and an emphasis on entrepreneurship. (Vishnu Gupta (2025)

Research that has already been done on the relationship between digital commerce and the global economy shows how it can support venture capital, jobs, and economic growth (Kshetri, 2018; UNCTAD, 2019). But issues including information security, digital literacy, and shortcomings in infrastructure still exist (TRAI, 2020).The report highlights that combating cybercriminals necessitates a multimodal strategy that includes outreach campaigns, regulatory measures, and technology-based solutions. We can create a safer and more resilient digital environment for all members of society by cooperating to increase awareness, improve cyber security capabilities, and promote a culture of alertness in cyberspace.(ms.Purvi Pandey Dec 2024.)

Additionally, e-commerce is boosting the arrival of products, which will benefit many facets of society in terms of learning new skills, developing innovative technologies, and improving Advertising strategies and job chances. Furthermore, the growth of digital marketing is accelerating.(Dr. J. Ratna Prabhakar 2025)

The federal government review of vikasit bharat Press Information Bureau/IBEF report; emphasis:

enhancing data gathering and digital tools to fortify India's statistical infrastructure for improved policy and planning. Decision-making is aided by timely GDP, CPI, and IIP estimates as well as national surveys on employment, education, and health.(Efforts To Make Viksit Bharat By 2047)

Research Methods:

Our study uses a combination of methods, integrating surveys, case studies, and secondary data analysis. We looked at the development patterns and effects of digital commerce in India by analyzing secondary data from records, sector surveys, and government publications.

Discussion:

India's Present Situation of Digital Commerce Due to rising internet penetration and smartphone use, India's digital commerce business has expanded quickly in the past few years. Digital payments are predicted to reach a value of one trillion dollars by 2023, and the e-commerce business is projected to grow to a total of $200 billion by 2026 (IIA, 2021).

Online Commerce's Effect on Economic Growth India's economy has benefited greatly from digital commerce; in 2020, online retailing accounted for 5.5% of the country's Economy (IIA, 2021). With nearly 5 million workers in the e-commerce industry in 2020, electronic commerce has also produced job opportunities (IIA, 2021). Factors Influencing and Complicating the Implementation of Digital Commerce Government efforts, technology developments, and shifting customer behaviour are the main forces behind India's embrace of digital commerce. But difficulties still exist,

Digital Economy-Data & Growth

Growth of Digital Transactions and Digital Economy Over Time Digital Economy Impact: India’s digital economy size in 2022: 6300 billion (estimated). Projected growth: $2.3 trillion by 2025.Contribution to GDP: 17% and rising. Growth in Digital Transactions’ (Unified Payments Interface) transactions: 128 billion in FY 2024. Digital transactions in India grew by 56% in the last year.

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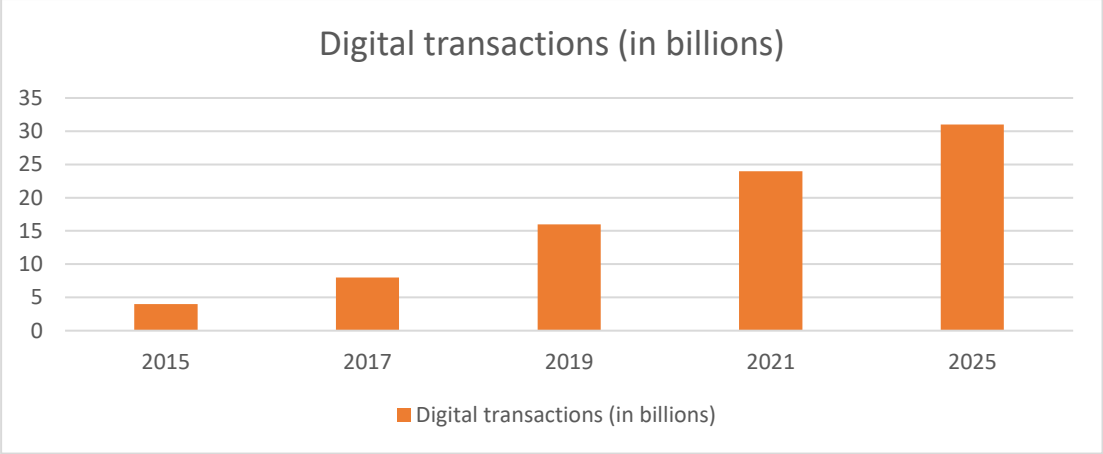

(Report by State of India's Digital Economy: A Subnational Perspective, 2025)

Challenges of Digital Commerce in viksit bharat 2047.

Digital Difference: Social and economic divides are made wider by disparities in access of internet.

Cybersecurity and Data Privacy: The risk of cyberattacks rises with increased reliance on digital infrastructure.

Legislative and Regulatory Issues: The ability of governments to properly regulate is frequently outpaced by rapid innovation.

Employment displacement: artificial intelligence and robotics may make some jobs obsolete, requiring reskilling initiatives.

Lack of Knowledge: The growth of electronic commerce in India is not considered to be very advanced because of rural exportation and people's ignorance, which are the outcomes of the Viksit Bharat 2047 plan. The rural population is still unaware of e-commerce and is hesitant to use it.

Fraudulent: More than 69% of Indians still avoid e-commerce because of the various types of fraud and theft that take place there, which seems to be impeding the sector's growth.

Conclusion:

India has established the objective of an advanced India by 2047, requiring all-around development, in honor of the country's 100th anniversary of independence. The most important component of this evolution is that attaining prosperity is mostly dependent on economic prosperity. E-commerce has the potential to boost India's GDP and financial system. Despite the fact that many of India's strategic and public-private partnership areas have been adopted by developed India, the role of digitalization of commerce appears to be significant. However, a number of challenges, including fraud, theft, and cybercrime, continue to prevent developed India from attaining this target by the viksit bharat 2047.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *The Impact of Digital Commerce in Achieving Viksit Bharat 2047*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout this project. Their support greatly enhanced my understanding of digital commerce and its role in national development.

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Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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2. Keywords: Digitalisation, Viksit Bharat 2047, Economic
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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Water Security and Sustainable Development challenges to Viksit Bharat: A Case Study of Maharashtra and India

Shital Ravindra Bavaskar,
Department of Geography, a research student at JDMVPS Arts, Commerce and Science College, Jalgaon. (M.S)

Manuscript ID:
BN-2026-030305

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 18-23

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839622
DOI link:
https://doi.org/10.5281/zenodo.20839622

Abstract

Water security is an urgent and complex challenge for India — one that is increasingly shaping livelihoods, health, gender relations, migration patterns, and governance. This paper reviews the drivers of water scarcity at national and state (Maharashtra) levels, documents the social impacts (with emphasis on rural agrarian distress, urban supply inequities, health and sanitation, gendered burdens, and socio-political tensions), evaluates current policy responses and community-level adaptations, and proposes evidence-based recommendations. The analysis uses national assessments (per-capita water availability and groundwater reports), government programs, academic literature, and recent media and official data on Maharashtra's drought-affected regions (Vidarbha, Marathwada) and urban systems (Mumbai–Pune region). Key findings: India is in the 'water-stressed' to 'scarcity' range by per-capita supply metrics; Maharashtra exhibits acute spatial disparity (urban resilience in Mumbai vs chronic rural shortages in Vidarbha and Marathwada); social consequences are profound and multifaceted; and policy responses exist but require better integration, local grounding, and focus on demand-management, groundwater governance, and social equity.

Keywords: *Water scarcity, Water stress, Groundwater depletion, Maharashtra, Marathwada, Vidarbha, Drought, Agriculture, Farmer distress, Migration, Gender inequality, Water governance.*

Introduction

Water underpins food security, public health, energy production, and socio-economic stability. Although India holds a significant share of the world's renewable water resources, its large and growing population, uneven rainfall, overextraction of groundwater, poor infrastructure, and pollution create chronic and seasonal shortages. Maharashtra — a large and economically important state — encapsulates India's water paradox: water-rich urban centers like Mumbai can experience relative supply security while large swathes of rural Maharashtra face repeated droughts and acute shortages, often prompting relief measures like tanker deliveries and crop losses. The social fallout includes farmer indebtedness and suicides, women's disproportionate labour burden, rural–urban migration, and tensions over resource allocation. This paper synthesizes evidence to understand causes, impacts, and policy implications.

Methods and Sources

This is a narrative literature synthesis drawing on (a) official national assessments (Central Water Commission / PIB on per-capita availability; NITI Aayog's Composite Water Management Index), (b) groundwater and water quality reports by the Central Ground Water Board (CGWB), (c) peer-reviewed literature on agrarian distress in Maharashtra, (d) high-quality news and government reporting on drought and urban supply in Maharashtra (water tanker statistics, reservoir levels), and (e) policy documents and government program descriptions (Jal Jeevan Mission, AMRUT 2.0, and state drought programs). Where possible, the most recent public data up to 2024–2025 were prioritized. The paper integrates quantitative indicators (storage levels, per-capita availability, tanker numbers) with qualitative studies on social impacts.

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Address for correspondence:
Shital Ravindra Bavaskar,Department of Geography, a research student at JDMVPS Arts, Commerce and Science College, Jalgaon. (M.S)
Email: shitalbavaskar95@gmail.com

How to cite this article:

Bavaskar, S. R. (2026). Water Security and Sustainable Development challenges to Viksit Bharat: A Case Study of Maharashtra and India. Bulletin of Nexus Journal, 3(3(II)), 18–23.
https://doi.org/10.5281/zenodo.20839622

Quick Response Code:

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Water Scarcity in India: Magnitude and Drivers

3.1 Magnitude: per-capita availability and groundwater trends

India's average annual per-capita water availability has been reassessed as approximately 1,486 cubic meters for 2021 and projected to decline further (e.g., to ~1,367 by 2031), placing the country in the 'water-stressed' category (threshold: 1,700 m^3/person/year), moving toward scarcity if trends continue. These national averages mask vast regional variation: some basins are water surplus while many northern and peninsular regions are overexploited. Groundwater — the nation's primary source for irrigation and drinking water — has been declining in several regions, with dynamic groundwater resource assessments showing worrying depletion and quality concerns in parts of the country.

3.2 Drivers of scarcity

Key drivers combine natural variability with anthropogenic pressures:

- **Population growth and urbanization** increasing absolute demand and concentrating needs in cities.
- **Agricultural patterns** that favour water-intensive crops (rice, sugarcane, some cash crops) in water-deficit zones without commensurate irrigation efficiency.
- **Overextraction of groundwater** driven by subsidized electricity and the inability of many smallholders to access reliable surface supplies.
- **Inefficient water use and distribution losses** in urban piped systems and agricultural conveyance.
- **Climate variability and changing monsoon patterns**, which increase drought frequency and intensity, and alter seasonal water availability.
- **Pollution and degradation of freshwater bodies**, reducing usable supplies.

Maharashtra: Patterns of Scarcity and Vulnerability

Maharashtra is geographically diverse: the fertile Western Ghats and Konkan coast, the industrialized urban corridors (Mumbai–Pune), and the relative. arid interior regions (Vidarbha and Marathwada). This heterogeneity shapes water risk.

1. **Rural distress: Vidarbha and Marathwada**
   Vidarbha and Marathwada have recurrent droughts, falling reservoir levels, and extensive reliance on groundwater. Recent reporting shows dam levels in several eastern districts at critically low percentages and large deployments of water tankers to meet drinking water needs — tankers rising from hundreds to thousands in drought years, reflecting acute supply failures in rural habitations. These shortages impact cropping choices, irrigation availability, and livelihoods, and intensify agrarian distress in cotton- and rainfed-crop belts.
2. **Urban dynamics: Mumbai and Pune**
   Mega-cities present a contrasting picture: Mumbai has historically relied on seven lakes and inter-basin transfers to maintain supply; reservoir storage and careful operational management can temporarily deliver relative security, but distribution losses and inequitable supply (slum areas facing shortfalls) persist. In some years Mumbai has faced mandated cuts or water-saving measures; in other seasons, reservoirs have recovered rapidly after monsoon rains. This urban variability underscores that city-level supply security is contingent on catchment rainfall, upstream management, and distribution efficiency.
3. **Socio-spatial inequity**
   Maharashtra exemplifies an inequitable water geography: relatively secure urban populations with infrastructure and political voice vs. rural, smallholder communities dependent on uncertain rainfall and overused groundwater — leading to starkly different social outcomes when droughts strike.

Social Impacts of Water Scarcity

Water scarcity cascades into multiple social domains. Below we synthesize the major impacts with evidence from Maharashtra and broader India.

1. **Agrarian livelihoods, indebtedness, and farmer suicides**
   Reduced irrigation, crop failures, and falling incomes push farmers into debt. Maharashtra's Vidarbha region has been central in studies linking crop failure, indebtedness, and a high incidence of farmer suicides. While farmer suicide is a complex phenomenon with multiple causes (socioeconomic, mental health, market failures), lack of reliable water — leading to crop failure and economic collapse — is a proximate and exacerbating factor in many cases documented in the literature. Recent state responses focus on drought relief, loan waivers, and schemes to improve agronomic practices, but structural water solutions remain inadequate for many smallholders.
2. **Gendered burden and household resilience**
   In rural areas, water scarcity intensifies women's unpaid laboured: fetching water, managing domestic shortages, and coping with reduced sanitation. This time poverty reduces opportunities for schooling, income generation,

and civic participation. Women also carry the health burden when water-borne disease incidence rises after water quality falls or sanitation is compromised. Gendered vulnerabilities combine with caste and class hierarchies — marginalized households are less able to access private borewells or purchase tanker water. Multiple studies and media reports document these disproportionate burdens in drought-affected regions.

3. **Health, sanitation, and disease**
   Intermittent supply and dependence on surface/untreated sources can increase water-borne diseases (diarrhoea, cholera risk during outbreaks) and impede hygiene practices. In peri-urban and informal settlements, limited piped supply forces households to rely on contaminated sources, with negative health outcomes especially for children. National surveillance data and public health literature link water insecurity to higher incidence of gastrointestinal diseases and malnutrition in children, although the local burden varies with sanitation, season, and service reliability.
4. **Migration and social disruption**
   Seasonal and distress migration is a documented coping mechanism: agricultural labourers and smallholder families migrate to towns for work when local water-dependent livelihoods fail. Migration can be temporary (seasonal) or longer term, breaking social networks and altering rural demographics. In Maharashtra, drought years have prompted increased movement toward peri-urban centers and construction work, but migrants often land in precarious jobs with inadequate services. Migration can mask agricultural distress in aggregated statistics while producing urban infrastructure and governance challenges.
5. **Conflict, governance, and resource allocation tensions**
   Scarcity raises competition between sectors (agriculture vs. industry vs. urban supply), between upstream and downstream users, and between states in inter-basin transfers. Local conflicts over water points, tanker distribution, and access to tubewells are common during acute shortages. Governance failures — unclear groundwater rights, fractured institutional responsibilities, and political short-termism — amplify tensions. Maharashtra's mobilization of thousands of tankers in drought periods is symptomatic of reactive governance rather than integrated resource management.

Policy Responses and Their Effectiveness

India and Maharashtra have multiple programs addressing water supply, demand management, and infrastructure — but with mixed integration and uneven outcomes.

1. **National programs: Jal Jeevan Mission, AMRUT 2.0, CWMI and beyond**
   The government of India has launched large programs to improve household tap connections (Jal Jeevan Mission), urban water security (AMRUT 2.0 with a focus on sewage reuse and lake rejuvenation), and performance tracking (NITI Aayog's Composite Water Management Index) to incentivize state action. These programs emphasize infrastructure, service delivery, and some elements of demand management. Their success depends on local capacities, monitoring, and complementary measures such as groundwater governance and agricultural reform.
2. **State-level measures in Maharashtra**
   Maharashtra has launched state drought relief programs, agricultural assistance (e.g., Nanaji Deshmukh Krishi Sanjivani Yojana), and ad hoc tanker deployments. While these measures provide emergency relief and some medium-term support, critics argue that they fail to address the root causes (fragmented water harvesting, poor watershed management, and poor enforcement of groundwater regulation). Emergency tanker provisioning, though politically necessary, is an expensive and unsustainable response if not combined with demand reduction and source recharge strategies.
3. **Institutional gaps and governance challenges**

- **Fragmented authority**: multiple agencies (state irrigation departments, municipal corporations, panchayats, basin authorities) have overlapping roles.
- **Data gaps**: groundwater monitoring and reliable localized water accounting remain limited despite CGWB reports.
- **Incentive misalignment**: subsidies on electricity for pumping encourage extraction; cropping incentives do not always align with water availability
- **Equity blind spots**: programs often fail to prioritize the poorest and socially marginalized, exacerbating unequal outcomes. NITI Aayog's CWMI aims to bring performance pressure but requires resourcing and political will for more structural reform.

Community and Technological Adaptations

Despite structural challenges, communities and technologists have developed adaptive measures:

1. **Water harvesting and recharge**
   Traditional and modern rainwater harvesting, check dams, percolation tanks, and watershed

interventions can significantly raise local water security were implemented at scale. Maharashtra has pockets where watershed programs and community tanks have improved recharge and reduced drought impacts, but scaling remains uneven.

2. **Irrigation efficiency and crop diversification**
   Micro-irrigation (drip and sprinkler systems) reduces water use per unit crop; shifting cropping patterns toward less-water-intensive crops in arid districts helps reduce pressure. Subsidies for micro-irrigation and extension support are necessary to encourage adoption among smallholders.
3. **Urban demand management and leak reduction**
   Cities can save substantial volumes by addressing distribution losses, implementing differential pricing, promoting rooftop rainwater harvesting, and reusing treated wastewater for non-potable uses. Mumbai's experience shows how reservoir operations can secure supply in the short term, but leakages and inequitable delivery need more attention.
4. **Social innovations and cooperatives**
   Community water user associations, cooperative management of local tanks, and stakeholder forums that mediate between farmers, municipalities, and officials have shown localized successes, particularly when combined with technical support and transparent water accounting.

Discussion: Linking Biophysical Scarcity to Social Outcomes

The Indian and Maharashtra cases show that water scarcity is not merely a hydrological problem but a socio-economic and governance challenge. A handful of reflections:

1. **Heterogeneity matters**: Aggregated national indicators (per-capita availability) are useful for framing urgency but obscure intra-state inequities — Maharashtra's contrasting urban/rural outcomes are instructive.
2. **Groundwater is both solution and risk**: It cushions shortages but its unregulated extraction generates long-term vulnerability. Groundwater governance (metering, community rights, regulating power subsidies) is central.
3. **Social dimensions amplify impacts**: Gendered labour burdens, indebtedness, and migration create feedback loops that entrench poverty in water-stressed areas. Interventions must therefore be socially informed, not only technical.
4. **Policy fragmentation reduces efficacy**: Programs addressing supply (treatment plants, pipelines) must link with demand management (pricing, efficiency) and ecological measures (recharge, pollution control). NITI Aayog's CWMI provides one comparative tool but needs to be operationalized into local governance reforms.
5. **Groundwater is both solution and risk**: It cushions shortages but its unregulated extraction generates long-term vulnerability. Groundwater governance (metering, community rights, regulating power subsidies) is central.
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Recommendations

To reduce water scarcity and its social harms in Maharashtra and India, an integrated, equity-focused approach is required. Key policy and operational recommendations follow:

1. **Strengthen groundwater governance**

- Implement transparent groundwater monitoring (expand CGWB networks), public dashboards, and local water accounting.
- Phase out perverse electricity subsidies for pumping (or link them to metered, time-limited supply) to reduce overextraction.
- Legal recognition and support for community groundwater institutions in critical regions.

2. **Invest in recharge and catchment restoration at scale**

- Prioritize watershed programs, check dams, and urban green infrastructure that increase infiltration and reduce runoff.
- Incentivize public-private and community partnerships for large-scale recharge in drought-prone districts (Vidarbha, Marathwada).

3. **Reorient agriculture toward water sustainability**

- Promote micro-irrigation with targeted subsidies for smallholders and ensure access to credit for capital goods.
- Encourage crop diversification and adjust procurement/pricing policies to reduce

incentives for water-intensive crops in water-scarce zones.
- Strengthen extension services and insurance mechanisms that reduce distress.

4. **Urban efficiency, equity and reuse**

- Prioritize loss reduction (non-revenue water), progressive pricing for excess domestic and commercial use, and targeted subsidies for poor households.
- Scale wastewater treatment and reuse for industrial and landscape uses; mandate rooftop rainwater harvesting in urban permits.

5. **Social protection and livelihood diversification**

- Design drought-linked social protection (cash transfers, employment under MGNREGA for water conservation works) to buffer immediate distress and reduce forced distress migration.
- Strengthen mental health and debt-relief counselling services for farmers in high-stress regions.

6. **Institutional integration and data transparency**

- Create basin-level coordination authorities with real decision-making power across sectors and jurisdictions.
- Publish timely data on reservoir levels, tanker distributions, and groundwater status to enable civil society oversight and early action. CWMI or a successor should incentivize outcomes and disaggregate indicators to capture intra-state inequity.

Conclusion

Water scarcity in India is a multi-dimensional crisis with strong geographical and social fault lines. Maharashtra's dual experience — urban water infrastructure that is resilient at times, and rural regions repeatedly pushed into crisis — makes visible the social costs of inadequate water governance. Addressing scarcity requires technical fixes (recharge, irrigation efficiency, wastewater reuse) and governance reforms (groundwater management, incentive realignment, integrated basin planning). Crucially, social equity must be central: interventions must prioritize the poor, women, and socially marginalized groups who bear the brunt of shortages. With climate variability likely to increase hydrological uncertainty, the time for integrated, scalable, and socially-attuned water policy is now.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Water Security and Sustainable Development: Challenges to Viksit Bharat – A Case Study of Maharashtra and India*.

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Financial support and sponsorship

Nil.

Conflicts of interest

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

A Comprehensive Study of Business Startup Initiatives in India: Policy Support, Comparative Analysis and Emerging Challenges

Kale Nilam Nivrutti
Research Student, S.N. Art's, D.J.M. Commerce & B.N. Sarda Science College (Autonomous), Sangamner, Dist: Ahilyanagar

Manuscript ID: BN-2026-030306

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 24-29

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI: 10.5281/zenodo.20839665
DOI link: https://doi.org/10.5281/zenodo.20839665

Abstract

In recent years, India has emerged as one of the fastest-growing start-up ecosystems in the world, driven by supportive government policies, rapid digital transformation, and increasing entrepreneurial participation. Start-ups have become an important component of economic development by promoting innovation, generating employment, and contributing to overall economic growth. This research paper aims to examine major business start-up initiatives introduced by the Government of India and to analyse their role in fostering entrepreneurship. The study focuses on key initiatives such as Start-up India, Make in India, Digital India, Atal Innovation Mission, Stand-Up India, and Mudra Yojana. It evaluates their objectives, features, and impact on the growth of start-ups across different sectors. The research is based on a descriptive and analytical methodology using secondary data collected from government reports, research publications, and official sources. The study also includes a comparative analysis of various initiatives to understand their effectiveness and contribution to the start-up ecosystem. The findings of the study indicate that government initiatives have significantly improved the start-up environment in India by providing financial support, simplifying regulatory procedures, and promoting innovation.

The paper concludes that while India has made considerable progress in developing a strong start up ecosystem, there is a need for better implementation of policies, improved infrastructure, and enhanced awareness of government schemes.

Keywords: *Start-up Ecosystem, Entrepreneurship, Government Initiatives, Innovation, Economic Development, Start-up India, Digital India, Make in India, MSMEs, Employment Generation.*

Introduction:

Entrepreneurship has become one of the most important drivers of economic growth and development in modern economies. In the context of India, the startup ecosystem has witnessed significant expansion over the last decade. This growth has been supported by various factors such as technological advancement, increasing digitalization, and a large young population willing to take entrepreneurial risks.

The Government of India has played a crucial role in promoting startups by introducing several initiatives aimed at encouraging innovation and reducing barriers to business entry. These initiatives have created a supportive environment for entrepreneurs by providing financial assistance, improving infrastructure, and simplifying regulatory procedures. As a result, India has emerged as one of the fastest-growing startup ecosystems globally.

Despite these positive developments, startups continue to face several challenges such as limited access to funding, infrastructure gaps, and skill shortages. Therefore, it becomes essential to study the various startup initiatives and evaluate their impact on the growth and sustainability of startups in India.

Review of Literature:

The development of startups in India has been widely discussed in various research studies, reports, and academic publications. Existing literature suggests that startups play a vital role in promoting innovation, employment generation, and economic diversification.

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Address for correspondence:
Kale Nilam Nivrutti, Research Student, S.N. Art's, D.J.M. Commerce & B.N. Sarda Science College (Autonomous),Sangamner, Dist: Ahilyanagar.
Email- kalenilam1987@gmail.com

How to cite this article:
Kale, N. N. (2026). A Comprehensive Study of Business Startup Initiatives in India: Policy Support, Comparative Analysis and Emerging Challenges. Bulletin of Nexus Journal, 3(3(II)), 24–29. https://doi.org/10.5281/zenodo.20839665

Quick Response Code:

Website: https://bnir.us

Several studies have highlighted that government initiatives have significantly improved the ease of doing business and encouraged entrepreneurial activities.

Research reports indicate that India has become one of the leading countries in terms of startup growth, especially in technology-driven sectors such as fintech, edtech, and healthcare. Digital transformation has also been identified as a key factor contributing to the expansion of startups.

Overall, the literature suggests that while government policies are supportive, there is a need for more effective implementation and increased awareness to ensure the long-term success of startups.

Objectives of the Study:

1. To study major business startup initiatives in India
2. To understand the role of government policies in promoting entrepreneurship
3. To analyze the growth of the startup ecosystem in India
4. To compare different startup initiatives and their effectiveness
5. To identify the key challenges faced by startups
6. To examine the impact of startup initiatives on employment and innovation
7. To suggest measures for improving the startup ecosystem

Research Methodology:

This study is based on a descriptive and analytical research design, focusing on understanding and evaluating startup initiatives in India. The research primarily relies on secondary data, which has been collected from various sources such as government reports, research journals, policy documents, and official publications. The collected data has been analyzed using qualitative methods, including comparative analysis.

Concept of Startup in India:

A startup is a newly established business that focuses on innovation and growth. In India, startups are recognized based on certain conditions such as turnover and originality of the idea. Startups are different from traditional businesses because they aim for rapid growth and often use technology. They operate in uncertain environments and require continuous innovation to succeed.

Business Startup Initiatives in India:

Startup India Initiative:

Startup India was introduced to promote entrepreneurship and support new businesses. It provides tax benefits, reduces compliance burden, and offers funding support. This initiative helps startups reduce initial costs and focus on growth. It has also created a network where entrepreneurs can connect with investors and mentors. As a result, the number of startups in India has increased significantly.

Make in India:

Make in India focuses on promoting manufacturing within the country. It encourages botth domestic and foreign companies to produce goods in India. This initiative has created opportunities for startups in industrial sectors and has contributed to employment generation. It also supports economic growth by increasing production.

Digital India:

Digital India aims to improve digital infrastructure and promote online services. It has made it easier for startups to operate through digital platforms. This initiative has supported the growth of sectors like fintech, e-commerce, and education technology. It has also helped startups reach customers in remote areas.

Atal Innovation Mission:

This initiative promotes innovation and creativity among students and young entrepreneurs. It provides facilities such as laboratories and incubation centers. By supporting innovation at an early stage, it helps develop future entrepreneurs and strengthens the startup ecosystem.

Stand-Up India Scheme:

Stand-Up India encourages entrepreneurship among women and socially disadvantaged groups. It provides financial support to help them start businesses. This initiative promotes inclusive growth and helps reduce inequality.

Mudra Yojana:

Mudra Yojana provides financial assistance to small and micro enterprises. It offers loans based on the stage of the business. This scheme has helped many individuals start their own businesses, especially in rural areas.

Comparative Analysis of Startup Initiatives:

Table:1. Comparative Study of Major Initiatives

Sr. No.	Initiative	Year	Objective	Key Feature	Target Group	Impact	Limitation
1.	Startup India	2016	Promote startups	Tax benefits, funding	Entrepreneurs	Growth in startups	Awareness gap
2.	Make in India	2014	Boost manufacturing	FDI support	Industries	Industrial growth	Infrastructure issues
3.	Digital India	2015	Digital development	Online platforms	Tech startups	Digital growth	Digital divide
4.	AIM (Atal Innovation Mission)	2016	Promote innovation	Labs & incubation	Students/startups	Innovation culture	Limited reach
5.	Stand-Up India	2016	Inclusive growth	Bank loans	Women, SC/ST	Social empowerment	Loan barriers
6.	Mudra Yojana	2015	Financial support	Small loans	Micro businesses	Self-employment	Repayment issues

Comparative Explanation:

The above comparison shows that each initiative focuses on a different aspect of the startup ecosystem. Startup India is the most comprehensive initiative as it directly supports entrepreneurs through policy and funding. Make in India mainly focuses on industrial development, while Digital India supports technological growth. Atal Innovation Mission plays a long-term role by developing innovative thinking among young individuals.

Stand-Up India and Mudra Yojana focus more on financial inclusion and support small and marginalized entrepreneurs. These initiatives are important for balanced and inclusive economic development. Overall, all these initiatives complement each other and contribute to the growth of the startup ecosystem in India.

Growth of Startup Ecosystem in India:

India has seen a significant increase in the number of startups in recent years. Startups are growing in sectors such as finance, healthcare, education, and agriculture. Many startups have achieved global recognition. The growth is not limited to big cities but is also spreading to smaller towns. Startups are contributing to job creation and skill development, which are important for economic progress.

Challenges Faced by Startups in India:

Despite the presence of strong government initiatives and a supportive policy framework, startups in India continue to face multiple structural, financial, and operational challenges. These challenges affect their growth, sustainability, and long-term success.

1. Financial Constraint and Funding Gaps:

One of the most critical challenges faced by startups is the lack of adequate funding, especially during the early stages of business development. Many startups in smaller cities and non-tech sectors struggle to secure financial support. Additionally, accessing bank loans is often difficult due to strict eligibility criteria, lack of collateral and perceived business risks. This creates a financial gap that limits innovation and restricts the scaling potential of startups.

2. Regulatory and Compliance Burden:

Startups in India frequently face challenges related to complex regulatory procedures and compliance requirements. Although initiatives like Startup India have simplified certain processes, many entrepreneurs still experience delays due to bureaucratic formalities. Frequent policy changes, multiple registrations, and legal documentation requirements create confusion and increase operational costs. This is particularly challenging for first-time entrepreneurs who lack experience in handling regulatory systems.

3. Infrastructure Limitations:

Infrastructure plays a vital role in the growth of startups. However, in many parts of India-especially rural and semi-urban areas-basic infrastructure such as reliable internet connectivity,

electricity, transportation, and logistics is still inadequate. These limitations create barriers for startups to operate efficiently and expand their business. Poor infrastructure also discourages investors from funding startups located in such regions.

4. Skill Gap and Lack of Expertise:

Another major challenge is the shortage of skilled human resources. Many startups face difficulty in finding employees with the required technical, managerial, and entrepreneurial skills. The gap between academic education and industry requirements results in a lack of practical knowledge among the workforce. This affects productivity, innovation, and decision-making within startups.

5. Market Competitions and Business Risk:

Startups operate in highly competitive environments where survival is uncertain. The presence of established companies, rapidly changing customer preferences, and market volatility increases the risk of failure. Many startups fail due to poor market research, lack of business planning, or inability to adapt to market changes. High competition also leads to pricing pressure and reduced profit margins.

6. Limited Accesses to Mentorship and Networking:

Successful startups often require guidance from experienced mentors and access to professional networks. However, many entrepreneurs, especially in smaller cities, lack such opportunities. The absence of proper mentorship can lead to poor decision-making, inefficient business strategies, and slow growth. Networking gaps also limit access to investors and market opportunities.

7. Awareness and Information Gap:

Although various government schemes are available, many entrepreneurs are not fully aware of these initiatives or do not understand how to access them. This lack of awareness is more prominent in rural areas, where information dissemination is limited. As a result, many potential entrepreneurs are unable to benefit from government support.

Findings of the Study:

Based on the analysis of startup initiatives and the challenges faced by entrepreneurs, several important findings have emerged from this study.

1. Positive Impact of Government Initiatives:

The study clearly indicates that government initiatives have played a significant role in promoting entrepreneurship in India. Programs such as Startup India, Digital India, and Mudra Yojana have created a supportive environment for startups. These initiatives have reduced entry barriers, improved access to finance, and encouraged innovation.

2. Growth of a Diverse Startup Ecosystem:

The research shows that the startup ecosystem in India is becoming more diverse and inclusive. Startups are emerging not only in metropolitan cities but also in smaller towns and rural areas. Different sectors such as fintech, healthcare, education, and agriculture are witnessing rapid growth. This diversification indicates a balanced development of the startup ecosystem.

3. Improvement in Innovation and Employment Generation:

Startups have contributed significantly to innovation by introducing new products, services, and business models. They have also played an important role in job creation, especially for young people.

4. Persistent Financial and Structural Challenges:

Despite the positive developments, the study finds that financial constraints and structural challenges continue to affect startups. Limited access to early-stage funding remains a major issue.

5. Gaps between Policy and Implementation:

Another key finding is the gap between policy formulation and its actual implementation. While policies are well-designed, their benefits do not always reach all sections of society. Administrative delays, lack of coordination, and limited awareness reduce the effectiveness of these initiatives.

6. Importance of Skill Development and Education:

The study highlights the need for stronger focus on skill development and entrepreneurship education. A skilled workforce is essential for the success of startups.

7. Need for Inclusive and Balanced Growth:

The findings suggest that while progress has been made, more efforts are required to ensure inclusive growth. Special attention should be given to rural areas, women entrepreneurs, and marginalized groups.

Policy Implications:

The findings of this study suggest several important policy implications that can help strengthen the startup ecosystem in India.

1. Strengthening Access to Finance:

There is a need to improve financial support for startups, especially at the early stages. Government and financial institutions should work together to provide easier access to credit and encourage investment. Special focus should be given to startups in rural and semi-urban areas.

2. Simplification of Regulatory Framework:

A more transparent and streamlined regulatory system can help startups operate more efficiently and reduce delays.

3. Development of Infrastructure:

Improving physical and digital infrastructure is essential for the growth of startups. Better internet connectivity, transportation, and logistics facilities can enhance business operations, especially in less developed regions.

4. Promotion of Skill Development and Entrepreneurship Education:

Educational institutions should focus more on practical learning, entrepreneurship training and Skill development programs.

5. Enhancing Awareness of Government Schemes:

Effective awareness campaigns and information dissemination can ensure that more people benefit from these schemes.

6. Encouraging Inclusive Growth:

Policies should focus on supporting women entrepreneurs, marginalized groups, and startups in rural areas.

7. Strengthening Mentorship and Networking Opportunities:

Balanced regional development is essential for creating a sustainable and equitable startup ecosystem in India.

Conclusion:

The study of business startup initiatives in India clearly shows that the country has made significant progress in developing a strong and dynamic entrepreneurial ecosystem. Government initiatives have played a key role in encouraging new business formation, promoting innovation, and generating employment opportunities.

In conclusion, business startup initiatives in India have laid a strong foundation for entrepreneurial growth. However, for long-term success, it is essential to address existing challenges and ensure effective implementation of policies. With continuous improvements and strategic support, India has the potential to become a global leader in the startup ecosystem.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *A Comprehensive Study of Business Startup Initiatives in India: Policy Support, Comparative Analysis and Emerging Challenges*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their expertise greatly enhanced my understanding of startup ecosystems, policy frameworks, and the challenges faced by emerging businesses in India.

I would also like to acknowledge the contributions of researchers, policymakers, and scholars whose work on entrepreneurship, economic development, and startup initiatives provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their support, motivation, and constructive feedback during the preparation of this work.

Finally, I am deeply grateful to my family for their unwavering encouragement, patience, and constant support, which made the successful completion of this project possible.

This accomplishment would not have been possible without the guidance and support of all these individuals.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Role of AI In Enhancing Digital Payment Security

Gavhale Pooja Balasaheb
Assistant Professor, Department of Commerce & Management, S.S.G.M College, Kopargaon

Manuscript ID:
BN-2026-030307

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 30-34

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839707
DOI link:
https://doi.org/10.5281/zenodo.20839707

Abstract

Strong security measures are crucial since digital transactions have grown more complex. Starting with an introduction of digital payment systems and the vital need for security, this paper investigates how artificial intelligence (AI) improves payment system security. The article describes typical risks and weaknesses and criticizes conventional security.

measures and recognizes obstacles. After that, it looks at AI technologies that are revolutionizing cybersecurity by enhancing threat detection and response, like machine learning and sophisticated algorithms. The role of AI in real-time transaction monitoring, behavioral analytics, and predictive risk scoring, as well as its applications in multi-factor authentication (MFA) and biometric systems, are important areas of focus. It also addresses the difficulties of integrating AI with current security frameworks and assesses its compatibility with conventional measures. and suggests fixes. Concerns about AI's ethics and privacy are also covered. The results show how AI significantly affects risk assessment, fraud detection, and general security. With important ramifications and suggestions for additional study, the report ends with insights into upcoming AI developments, predictive analytics, and their role in changing payment systems.

Keywords: *Cybersecurity, fraud detection, digital transactions, payment system security, and security measures*

Introduction

Digital payment systems have completely changed the financial transaction environment by replacing traditional cash transactions with sophisticated electronic ones. Today's digital payment systems include various innovations such as online banking, mobile payments, and cryptocurrencies, which have greatly enhanced the efficiency and accessibility of financial services. However, this progress brings significant challenges in maintaining security, underscoring the need for effective protection of digital transactions. Because cyber threats are becoming more common and sophisticated, it is imperative to ensure security in digital payments.. With the expansion of digital payment methods, recognise odd trends and spot possible fraud. By accurately identifying complex patterns, deep learning improves these talents. By deciphering and evaluating textual data, such as transaction notes and user interactions, to identify dangers, natural language processing further contributes to security. Predictive analytics, which helps financial organisations anticipate and proactively manage possible risks, is supported by AI. AI-powered real-time risk assessment reduces the effect of security breaches by enabling prompt reactions to suspicious activity.

Additionally, AI enhances user authentication with cutting-edge biometric technologies like fingerprint scanning and facial recognition, offering a more practical and safer substitute for conventional techniques. By combining several authentication factors and adjusting to emerging threats, enhanced multi-factor authentication (MFA), strengthened by AI, provides an extra security layer. An important development in security technology is the integration of AI into digital payment systems. AI delivers advanced capabilities for risk management, fraud prevention, and threat detection while addressing the drawbacks of conventional techniques. AI will be essential in creating strong security solutions to fend off new cyberthreats as digital payment technologies expand.

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Address for correspondence:
Gavhale Pooja Balasaheb, Assistant Professor, Department of Commerce & Management, S.S.G.M College, Kopargaon
Email-poojagavhale69@gmail.com

How to cite this article:
Gavhale, P. B. (2026). Role of AI In Enhancing Digital Payment Security. Bulletin of Nexus Journal, 3(3(II)), 30–34. https://doi.org/10.5281/zenodo.20839707

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Objectives

- To evaluate the current level of security of digital payments.
- To evaluate AI technology in cybersecurity
- To investigate AI's application in authentication
- To research AI-powered fraud detection and prevention techniques
- To deal with ethical and privacy concerns

Fundamentals Of Digital Payment Security

The way transactions are conducted has been completely transformed by digital payment systems, which increase efficiency and convenience. But they also bring along a number of security problems. Phishing and social engineering, which deceive users into disclosing private information; malware and ransomware attacks, which can harm systems and demand ransom; data breaches that reveal personal information; man-in-the-middle (MitM) attacks, which intercept and modify communications; and card skimming, in which unauthorised devices obtain card details, are some of the major threats. The likelihood of cyberattacks, such as identity theft, fraud, and data breaches, has increased. Even though they are crucial, traditional security measures like encryption and multi-factor authentication frequently fail to keep up with the constantly changing threat landscape. Advanced security solutions are necessary to safeguard sensitive financial data and preserve customer confidence due to the complexity and scope of cyber-attacks. In order to improve the security of digital payments, artificial intelligence (AI) has become a crucial technology. Artificial intelligence (AI) technologies, such as deep learning, machine learning, and natural language processing, provide sophisticated ways to secure transactions. Large amounts of transaction data can be processed and analysed by machine learning to Conventional security measures are used to reduce these dangers. Data is protected during transmission by encryption methods like Transport Layer Security (TLS) and Secure Socket Layer (SSL). Tokenisation lowers the risk of exposure by substituting non-sensitive tokens for sensitive data. By demanding two forms of verification, two-factor authentication (2FA) adds an extra layer of protection. Algorithms are used by fraud detection systems to identify anomalous activity, and frequent software updates address known flaws and guard against new threats.

Artificial Intelligence in Cybersecurity

Artificial Intelligence (AI) plays a critical role in strengthening cybersecurity as digital payments become essential to international trade. Artificial intelligence (AI) technologies, such as machine learning, natural language processing, and neural networks, mimic human intellect to analyse data and make well-informed judgements by providing complex solutions to handle the constantly changing landscape of cyber threats. Machine learning stands out among these due to its effectiveness in strengthening cybersecurity defences. Machine learning is used in many crucial applications, such fraud detection, where it carefully examines transaction patterns in real-time to stop fraud. By evaluating behavioural biometrics, such as typing patterns and mouse dynamics, it improves user authentication even further. Furthermore, machine learning is excellent at detecting malware, using thorough software behaviour analysis to find both known and new malware**.** Advanced threat detection and response methods are just one of AI's contributions to cybersecurity. It makes it easier to quickly identify possible dangers from a variety of data sources, allowing for timely intervention. Additionally, AI automatically responds to attacks by putting pre-established security measures in place to lessen possible harm. Additionally, by combining historical and new data, AI-driven predictive analytics foresees future dangers, strengthening organisational defences. AI technologies are revolutionising cybersecurity by improving the security and dependability of digital payment systems. The significance of AI in safeguarding digital transactions will grow as cyber threats continue to change.

Ai Techniques for Enhancing Payment Security

The fight against financial crime and unauthorised transactions is being revolutionised by artificial intelligence (AI). AI systems are creating a strong barrier around digital payments by using advanced approaches. Large amounts of transaction data are being carefully examined by AI-powered systems in order to spot odd trends that might indicate fraud. These clever tools continuously adjust to changing threats and improve their capacity to thwart attacks by learning from previous events.AI algorithms are able to quickly identify transactions that depart from the expected by using typical transaction behaviour as a benchmark. An early warning system for possible fraud is provided by using sophisticated statistical techniques to identify anomalies that might evade conventional security measures.

By examining trends in device interactions, AI systems generate comprehensive profiles of each user's behaviour. AI can identify any fraudulent activity or unauthorised access by keeping an eye out for notable variations in these patterns, providing an additional degree of security.AI makes it possible to assess transaction risk instantly by taking into account a variety of variables, such as past data and present behaviour.

This real-time analysis greatly strengthens overall payment security by enabling systems to instantaneously prohibit or flag problematic transactions. In the fight against financial crime, AI is a powerful partner. Businesses may build a more secure digital payment environment and increase consumer trust by utilising its features.

Ai-Driven Fraud Detection and Prevention

The use of artificial intelligence (AI) for real-time monitoring has become a crucial tool in the battle against fraud in the rapidly developing field of digital transactions. AI techniques, such as machine learning. By seeing possible dangers before they materialise, predictive analytics enhances security even further. AI can anticipate and mitigate new threats by analysing patterns and trends, allowing for proactive steps to safeguard digital payment systems and reduce total risk. Additionally, AI has changed verification and authentication processes. AI has greatly improved biometric authentication advancements including voice recognition, fingerprint scanning, and facial recognition. Deep learning techniques are used by AI-powered systems to improve identity verification's precision and effectiveness.

Neural networks and models make it possible to analyse transaction data instantly and identify possibly fraudulent activity. These sophisticated AI systems identify variations that may indicate fraudulent activity by using vast amounts of past data to create standard behavioural patterns. To spot anomalies, these systems, for instance, can track user behaviour, transaction speed, and location in real-time. Anomaly detection methods and behavioural analytics are essential for improving AI-based fraud prevention. AI can identify anomalies that deviate from expected norms and suggest possible fraudulent activity by examining trends in user behaviour. By building unique user profiles based on behavioural traits, methods like analysing typing patterns, mouse movements, and touchscreen interactions give an additional degree of protection.

Behavioural analytics is more effective in identifying small irregularities and lowering the possibility of false fraud alarms because it adapts to changes in user behaviour, unlike previous static approaches. Predictive analytics and AI-driven risk scoring are essential for anticipating and controlling possible security risks. Risk scoring algorithms take into account a number of factors, such as transaction history and user behaviour, to determine the likelihood that a transaction is fraudulent. Over time, these models improve and become more accurate. The dynamic aspect of fraudulent activity is addressed by using anomaly detection techniques, such as deep learning models and clustering algorithms.

With an F1 score of 86%, recall of 85%, and precision of 88%, these methods detect anomalous patterns and outliers, giving the fraud detection system an additional degree of flexibility.

Integration Of Ai with Existing Security Frameworks

A significant advancement in financial security is the incorporation of artificial intelligence (AI) into current digital payment security systems. transactions. While multi-factor authentication, firewalls, and encryption are still essential security measures, AI provides a potent supplement via offering sophisticated analysis tools and flexible threat response systems. The potential of AI to enhance current security systems resides in its ability to quickly process enormous volumes of data and spot patterns that human analysts would miss.

Organisations must carefully handle these issues if they are to fully reap the benefits of AI in digital payment security. Businesses can successfully incorporate AI into their security frameworks by creating standardised interfaces, giving security of AI models first priority, and utilising cloud-based AI solutions. They will be able to use AI to strengthen their defences against the constantly changing panorama of cyber threats thanks to this strategic strategy. In the end, building a strong and resilient digital payment ecosystem requires the collaboration of AI and conventional security mechanisms. When combined, these technologies can offer a thorough defence against financial fraud and illegal access, protecting both customers and companies.

Literature Review

Fighting money laundering must be a top priority for financial institutions. This illegal practice is passing off illicit proceeds as assets or legal revenue (Swamy, 2011)

Cybercrime was one of the most common economic crimes recorded by businesses worldwide, according to 2014 PwC research. 2019 saw the release of important data from KPMG's comprehensive study on global banking frauds, which included 43 retail banks—13 from Asia Pacific, 5 from America, and 25 from Europe, the Middle East, and Africa. Of these banks, 31 employed more than 10,000 people globally, and 18 had sales of more than $10 billion. The paper states that fraud cases have increased, with cyber frauds being particularly challenging in most locations (Sood, P., & Bhushan, P., 2020). Although the majority of research on payment processing concentrates on speed, customer pleasure, and fundamental security, there is a lack of knowledge

regarding how to fully assess the security of quick payment methods (Patel et al., 2019). From manual methods, payment systems have undergone a significant evolution. The emergence of electronic funds transfers (EFT) in the 1970s accelerated the flow of money. Cashless choices were provided by credit and debit cards. Internet transactions were protected by online payment gateways. Payments were made much simpler by mobile services like Google Wallet and Apple Pay (Husni, 2017)

The security of payment processing is still a major problem in spite of these technological developments. Cyber criminals are growing increasingly skilled, discovering fresh weaknesses. Payment processors may suffer financial losses and reputational harm as a result of security breaches (Patel et al., 2022)

Future Trends and Developments

Security measures have had to change in tandem with the increase in digital transactions. Artificial intelligence is leading this change. (AI), which is changing how payments are secured. Our financial data is increasingly being watched upon by AI-powered technologies. Advanced machine learning algorithms quickly spot anomalies that can indicate fraudulent behaviour by carefully examining transaction patterns. Because these intelligent systems can learn and adapt, they become more skilled at foiling fraudsters' strategies. Additionally, the incorporation of AI-driven biometric authentication adds an additional degree of security, guaranteeing that only those with permission can access money. A key component of proactive security is AI-powered predictive analytics. These technologies can foresee possible risks by analysing past data and seeing patterns, enabling financial organisations to put preventative measures in place before breaches happen. In addition to protecting sensitive data, this proactive strategy gives stakeholders and customers confidence. AI has an impact that goes beyond preventing fraud. Through AI-powered chatbots and virtual assistants that provide effective and safe help, it is transforming the consumer experience. AI is also crucial in the creation of decentralised payment systems that improve security and transparency, like blockchain.AI technology's influence on how payments are made in the future will only increase as it develops. AI has the potential to make digital transactions safer and more accessible for everyone by strengthening defences against cyber-attacks and improving the overall payment experience.

Challenges And Limitations of Ai in Payment Security

There is a lot of potential for identifying and stopping fraud when artificial intelligence (AI) is incorporated into digital payment security. To fully realise AI's promise in this field, a number of obstacles and restrictions must be overcome. Large volumes of data are needed by AI systems, which raises serious questions concerning data privacy and ethical use. Sensitive financial data must be protected, yet data processing, storage, and gathering might reveal weaknesses like abuse and unauthorised access. To guarantee justice and stop prejudice, ethical issues—including possible biases in AI algorithms—must also be taken into account. Global rules, such as the General Data Protection Regulation (GDPR) in Europe, which places stringent restrictions on data usage, must be adhered to by AI systems. Strong consent, data minimisation, and transparency measures are necessary to ensure compliance. Even with these developments, AI is still unable to handle complicated fraud scenarios because scammers are always changing their strategies. AI models must be continuously improved and adjusted because current AI technologies might not be able to recognise complex fraud trends. Another technical challenge is integrating AI with current payment infrastructures. The inflexible structures of legacy systems may make it difficult to integrate cutting-edge AI technologies. This integration procedure can be expensive and time-consuming, requiring significant adjustments for compatibility and peak performance. Payment security systems powered by AI must strike a balance between detecting fraudulent activity and reducing false positives and negatives. False positives can annoy users and undermine trust when genuine transactions are reported as fraudulent. False negatives, in which real fraud goes unnoticed, can cause serious financial losses as well as reputational harm. These errors affect trust and user experience.

Conclusion

Digital payment security is undergoing a profound transformation thanks to artificial intelligence. AI has the potential to improve risk assessment, fraud detection, and general security, as was shown in the analysis that came before it. Its capacity to analyse large information, spot complex patterns, and anticipate possible dangers enables systems to recognise and react to fraudulent activity instantly. Additionally, by examining behavioural irregularities, AI-driven behavioural biometrics greatly enhance user authentication. But integrating AI in this field is not without its difficulties. Critical factors include protecting sensitive user data, reducing algorithmic biases, and striking a balance between security and privacy. To fully utilise AI, responsible development and implementation are essential. AI-powered predictive analytics present

significant opportunities for preventative security solutions. Financial organisations can foresee risks and put countermeasures in place by examining past data and spotting new trends. This strategy not only protects private data but also builds customer confidence. A cooperative strategy including business, academics, and government is necessary to fully realise the advantages of AI while reducing its drawbacks. The sector can provide a strong foundation for AI-driven payment security by tackling problems including data privacy, algorithmic bias, system integration, and accuracy.

Acknowledgment

I want to sincerely thank everyone who helped me finish this research paper on the "Role of AI In Enhancing Digital Payment Security." First and foremost, I would like to express my gratitude to Prof. Dr. Arjun Bhagwat Sir for his helpful advice, steadfast support, and perceptive criticism during the study process. Their knowledge and support have been a continual source of inspiration. Additionally, I would like to thank my colleagues and peers for continuously providing a supportive environment for the development of ideas and advancement.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Artificial Intelligence and Machine Learning: Applications, Challenges and Future Scope

Yogita Ravsaheb Rahane
Asst. Prof. Loknete Balasaheb Thorat Arts, Commerce and Science College, Talegaon Dighe, Tal. Sangamner, Dist. Ahilyanagar

Manuscript ID:
BN-2026-030308

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 35-38

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839749
DOI link:
https://doi.org/10.5281/zenodo.20839749

Abstract

Artificial Intelligence (AI) and Machine Learning (ML) have emerged as revolutionary technologies that are significantly transforming modern society and reshaping various sectors such as healthcare, education, finance, agriculture, and industrial production. These technologies enable machines to simulate human intelligence and perform complex tasks efficiently with minimal human intervention. This research paper examines the fundamental concepts, evolution, and practical applications of AI and ML, emphasizing their growing relevance in the digital age. It also highlights key machine learning approaches such as supervised learning, unsupervised learning, and reinforcement learning, along with their real-world applications. Furthermore, the study explores critical challenges including data privacy, ethical concerns, algorithmic bias, and technological limitations. The paper concludes by discussing the future scope of AI and ML, emphasizing their potential to drive innovation, economic growth, and sustainable development. The findings suggest that while AI and ML offer immense opportunities, their responsible and ethical implementation is essential for ensuring long-term societal benefits.

Keywords: *Artificial Intelligence (AI), Machine Learning (ML), Deep Learning, Neural Networks, Data Science, Intelligent Systems, Digital Transformation.*

Introduction:

Artificial Intelligence (AI) and Machine Learning (ML) represent some of the most influential technological advancements of the 21st century. These technologies aim to create systems capable of performing tasks that typically require human intelligence, including reasoning, problem-solving, decision-making, language understanding, and visual perception. AI serves as the broader concept of intelligent machines, while ML is a subset that focuses specifically on enabling systems to learn from data and improve performance over time without explicit programming.

Over the past few decades, the rapid increase in data generation, advancements in computational power, and development of sophisticated algorithms have accelerated the growth of AI and ML technologies. Today, these technologies are widely applied across various domains. In healthcare, AI assists in disease diagnosis and medical imaging; in finance, it supports fraud detection and risk analysis; in education, it enables personalized learning; and in industries, it drives automation and efficiency.

This research paper aims to explore the concepts, importance, applications, challenges, and future scope of AI and ML, while also analyzing their impact on modern society and sustainable development.

Objectives of the Study:

The study aims to understand the concepts of AI and ML, examine their evolution, analyze different machine learning techniques, and explore their applications across sectors. It also evaluates their impact on society, identifies challenges, and assesses future potential while suggesting ethical practices.

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Address for correspondence:
Yogita Ravsaheb Rahane,Asst. Prof. Loknete Balasaheb Thorat Arts, Commerce and Science College, Talegaon Dighe,Tal. Sangamner, Dist. Ahilyanagar
Email: yogitarahane54@gmail.com

How to cite this article:
Rahane, Y. R. (2026). Artificial Intelligence and Machine Learning: Applications, Challenges and Future Scope. Bulletin of Nexus Journal, 3(3(II)), 35–38. https://doi.org/10.5281/zenodo.20839749

Quick Response Code:

Website: https://bnir.us

Research Methodology:

This study adopts a descriptive and analytical research design based on secondary data sources such as books, journals, research papers, and online reports. A qualitative approach is used to understand theoretical concepts and real-world applications.

Data is analyzed using thematic and comparative methods. The study focuses on sectors such as healthcare, education, finance, and industry while acknowledging limitations such as reliance on secondary data and rapidly evolving technology.

Concept of Artificial Intelligence and Machine Learning:

Artificial Intelligence refers to the capability of machines to mimic human intelligence and perform tasks that typically require cognitive functions. These include learning, reasoning, and decision-making. AI systems are designed to simulate human thinking processes and improve their performance over time.

Machine Learning, a subset of AI, focuses on developing algorithms that allow machines to learn from data. Instead of being explicitly programmed, ML systems identify patterns, make predictions, and improve through experience. The concept of AI and ML is based on creating adaptive systems that evolve continuously with new data inputs.

These technologies are closely linked with big data, cloud computing, and automation, enabling applications such as virtual assistants, recommendation systems, autonomous vehicles, and intelligent analytics.

Definitions by Scholars:

John McCarthy (1956) defined Artificial Intelligence as "the science and engineering of making intelligent machines."

Marvin Minsky described it as "the science of making machines perform tasks that require human intelligence."

Stuart Russell and Peter Norvig defined AI as the study of intelligent agents that perceive their environment and act to achieve specific goals.

Importance of Artificial Intelligence and Machine Learning:

AI and ML have become integral to modern technological ecosystems due to their ability to transform operations and decision-making processes. Their importance can be understood through the following aspects:

AI and ML enable automation of repetitive and complex tasks, significantly reducing human effort and increasing productivity. They enhance decision-making by analyzing large datasets and providing accurate insights, which are critical for organizations and governments. These technologies improve efficiency and accuracy, allowing systems to perform tasks faster than humans.

In healthcare, AI contributes to early disease detection, personalized treatments, and improved patient care. Economically, AI and ML drive growth by fostering innovation, creating new industries, and generating employment opportunities. They also enhance customer experience through personalized recommendations and intelligent customer service systems.

Furthermore, AI plays a vital role in handling big data by extracting meaningful insights from vast datasets. It also supports emerging technologies such as robotics, smart cities, and autonomous vehicles, making it a foundational element of future technological development.

Characteristics of AI and ML:

AI and ML systems possess several defining characteristics. They have the ability to learn from data and improve performance over time. They support automation, reducing human involvement in repetitive tasks. These systems rely on data-driven decision-making, ensuring accuracy and efficiency.

They are highly adaptable, allowing them to adjust to new data and environments. Pattern recognition is another key feature, enabling applications such as image and speech recognition. AI systems also demonstrate strong problem-solving capabilities and high processing speed.

Additionally, ML models exhibit self-improvement as they are exposed to more data. They integrate seamlessly with modern technologies such as cloud computing and IoT, and their wide applicability makes them useful across various sectors.

Scope of Artificial Intelligence and Machine Learning:

The scope of AI and ML is vast and continuously expanding. In healthcare, these technologies are used for disease prediction, drug discovery, and personalized medicine. In education, they facilitate personalized learning and intelligent tutoring systems.

In business and finance, AI enhances fraud detection, risk assessment, and customer service. Industrial sectors benefit from automation, predictive maintenance, and quality control. In transportation, AI supports autonomous vehicles and traffic management systems.

Agriculture uses AI for crop monitoring and smart farming, while e-commerce relies on recommendation systems and customer behavior analysis. AI also plays a crucial role in cyber security by detecting and preventing cyber threats.

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The future scope includes advancements in robotics, smart cities, and IoT, making AI a key driver of innovation and sustainable development.

Challenges of Artificial Intelligence and Machine Learning:

Despite their advantages, AI and ML face several challenges. Data privacy and security are major concerns due to the large volumes of data required. Algorithmic bias can lead to unfair or inaccurate outcomes.

High implementation costs and the lack of skilled professionals limit widespread adoption. The complexity of AI models makes them difficult to interpret, raising transparency issues. Ethical concerns such as accountability and misuse of technology are also significant.

Additionally, the effectiveness of ML models depends on data quality. Automation may lead to job displacement, creating economic challenges. Regulatory and legal uncertainties further complicate the implementation of AI technologies.

Data Analysis and Findings:

The analysis reveals a rapid increase in the adoption of AI and ML technologies across various sectors. These technologies are widely used in healthcare, finance, education, and industry, demonstrating their versatility.

Machine learning techniques such as supervised, unsupervised, and reinforcement learning play a crucial role in data analysis and decision-making. AI improves efficiency, reduces human error, and enhances productivity.

However, challenges such as data privacy, algorithmic bias, and lack of skilled professionals persist. Ethical concerns highlight the need for responsible AI development.

Future trends indicate continued advancements in deep learning, automation, and natural language processing, further strengthening the role of AI in digital transformation.

Findings:

The findings highlight the transformative impact of AI and ML on modern society. These technologies enhance efficiency, improve decision-making, and drive innovation across sectors.

Their widespread applications demonstrate their importance in solving complex problems and optimizing processes. However, challenges such as ethical concerns, data privacy, and high costs must be addressed to ensure sustainable development.

The integration of AI with emerging technologies will further expand its capabilities, making it a crucial component of future technological advancements.

Suggestions / Recommendations:

1. Promote ethical AI practices.
2. Strengthen data privacy and security.
3. Increase investment in research and development.
4. Enhance education and skill development.
5. Encourage interdisciplinary collaboration.
6. Ensure inclusivity and accessibility.
7. Develop regulatory frameworks.
8. Reduce algorithmic bias.
9. Support sustainable development.
10. Encourage responsible innovation.

Conclusion:

Artificial Intelligence and Machine Learning are powerful technologies that are transforming the modern world. They offer numerous benefits, including automation, improved efficiency, and data-driven decision-making.

However, challenges such as ethical issues, data privacy, and algorithmic bias must be carefully managed. Responsible implementation and proper regulation are essential to maximize their benefits.

The future of AI and ML is promising, with the potential to drive innovation, economic growth, and sustainable development.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Artificial Intelligence and Machine Learning: Applications, Challenges and Future Scope*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, constant encouragement, and insightful suggestions throughout the course of this project. Their expertise greatly enhanced my understanding of artificial intelligence and machine learning concepts and their real-world applications.

I would also like to acknowledge the contributions of researchers, scientists, and scholars whose work in the fields of artificial intelligence and machine learning provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their support, motivation, and constructive feedback during the preparation of this work.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Determinants and Outcomes of Digital Governance Adoption in Charitable Trusts

Swapnil Sunil Ghule
Ph. D. Research Scholar, Shri Shiv Chatrapati College, Junnar

Manuscript ID:
BN-2026-030309

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 39-42

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839800
DOI link:
https://doi.org/10.5281/zenodo.20839800

Abstract:

Digital governance has a critical mechanism for improving transparency, accountability, and operational efficiency in charitable trusts, particularly in the side of increasing regulatory Control and stakeholder expectations. This study Observe the area of adoption of digital governance practices in charitable trusts identifies key barriers which causes problem to their implementation, and evaluates their impact on organizational performance.

The study uses a mixed-methods approach, combining secondary data from regulatory reports and policy documents with primary data gathered from specific charitable trusts through structured interviews and questionnaires.

Even though most organizations have switched to basic digital tools, such like accounting software, online banking, and compliance portals, it's still pretty rare to see advanced digital governance systems in place. Stuff like integrated management information systems, data analytics, or digital dashboards just aren't all that common yet. Still, the study makes it clear, when organizations do adopt digital governance, they see real improvements. It becomes easier to follow the rules, finances become clearer, and decision-making becomes sharper.

The research adds the small line to the literature by presenting empirical data from the aspect of Indian charitable trusts, which remains relatively untouchable in various aspects. In the practical way, the findings give suggestion to the trustees, administrators, and lawmakers with important insights to develop planned capacity building initiatives and supportive legal systems. The research highlights the significant potential of digital governance to improving the efficiency and sustainability of charitable trusts.

Keywords: *Digital governance, Charitable trusts, Transparency, Accountability, Organizational performance, CSR*

Introduction

Charitable trusts play Important role in socio-economic development by delivering education, healthcare, and social welfare services. In last some years, these organizations have faced increasing demands for transparency, accountability, and regulatory compliance. Digital governance, structured as the use of digital technologies to support governance processes, decision-making, and accountability mechanisms, has emerged as a strategic response to these demands.

The increasing digitization of regulatory frameworks in India—such as online income tax filings, digital charity commissioner portals, Online CSR Exchange Portal, FCRA Portal, NGO Portal, CSR Stakeholder all based on Online platform and mandatory electronic reporting has made digital governance not only an option but a necessity of the hour. yet, the adoption of digital governance practices across charitable trusts remains unlike. While some trusts have successfully support digital tools to enhance performance, others continue to rely on traditional, manual systems.

Even the important role of administration, many NGOs in India fight with internal management issues. These include shortage of professional administrative staff, insufficient infrastructure, poor financial plan and limited access to technology. In addition, navigating India's complex legal and regulatory environment seeks time and expertise which is a shortage of many NGOs.

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Address for correspondence:
Swapnil Sunil Ghule, Ph. D. Research Scholar, Shri Shiv Chatrapati College, Junnar
Email:

How to cite this article:
Ghule, S. S. (2026). Determinants and Outcomes of Digital Governance Adoption in Charitable Trusts. Bulletin of Nexus Journal, 3(3(II)), 39–42. https://doi.org/10.5281/zenodo.20839800

Quick Response Code:

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As a result, administrative disabilities often remove attention and resources from main social activities, leading to low outreach, stalled projects and compromise service distribution

This study seeks to explore the current state of digital governance in charitable trusts, identify the barriers to its adoption, and analyze its impact on organizational performance. By focusing on these dimensions, the research aims to bridge the gap between policy intent and practical implementation

Review of Literature

Digital governance is use of digital tools and technologies to manage and improve the way an organization is governed by the Organizer. in the digital Governance the use of computers, software, online systems, and digital platforms to support decision-making, record keeping, reporting, and control. Studies show that digital governance helps organizations become more clear, reduces gaps in information, and improves communication with stakeholders in clarity way. In charitable and non-profit organizations, digital governance plays an important role in meeting legal requirements, maintaining accurate records, submitting reports on time, and monitoring organizational performance in a systematic and up to date manner.

Charitable trusts face some governance challenges because they many times administer with limited financial and human resources. Most of the trusts are managed by trustees who look into on a voluntarily and not have professional training in administration or governance. In addition, charitable trusts serve multiple stakeholders such as beneficiaries, donors, regulators, and the general public, which makes governance more complex. Research shows that weak governance systems can result in poor decision-making, delays in statutory compliance, misuse of funds, and a loss of public confidence in the trust

Different sectors show that the use of Digital technologies has a positive impact on organizational performance. Organizations that follow digital systems are able to manage finances more properly and manage it do it in right way, improve efficiency, and make better decisions. In charitable organizations, digital tools help in boost financial control, effective program implementation, and improved trust among donors and stakeholders. However, studies also point out that digital governance is some of the time limited by factors such as lack of technical skills, high implementation costs, and resistance to change within the organization

Problem Statement

Existing studies of Literature on digital governance have importantly give more attention on corporate organizations and public-sector institutions, where there digital systems are more structured and widely adopted due to financial and Other Resources Availability. As a result, charitable trusts have received relatively less academic attention due to various factors. There is limited actual research that study how far charitable trusts have adopted digital governance practices, what challenges they face in implementing these systems, and how digital adoption impact their organizational performance. This gap in the literature highlights the need for systematic and evidence-based studies that specifically address digital governance in the context of charitable trust.

Research Objectives

The objectives of this study are:

1. To examine the level of adoption of digital governance practices in charitable trusts.
2. To identify the key barriers to digital governance implementation.
3. To assess the impact of digital governance on organizational performance

Limitations of the Study

- Limited to 10 NGOs who are ready to participate in interviews and survey.
- Mainly focuses on administrative aspect, not other operations or external factors.
- Financial data and internal reports were partially accessible due to privacy concerns or limited accessible opportunities.
- Besides the representative, NGO who can take for Study cannot occupy the complete diversity of NGO Type.
- The study is geographically present the practices of selected trusts only, which may not represent conditions in other regions.
- The research data obtained partly from self-reported data obtained through questionnaires and interviews, which may be influenced by respondent bias or subjective opinion.
- The study Highlights primarily on trustees and administrators, and does not extensively capture the perspectives of beneficiaries or donors, which could provide additional insights into the effectiveness of digital governance practices.

Research Design

The study adopts a combining qualitative and quantitative methods

Research Methodology

This research adopts a mixed-methods but focused on survey method to capture both quantitative and qualitative data. It is based on secondary data from published literature, government reports, NGO annual reports, and questionnaire and CSR records.

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Sample:

The sample consists of Ten charitable trusts selected using purposive sampling. Primary data were collected through structured questionnaires and interviews with trustees and administrators. Secondary data were sourced from annual reports, regulatory filings, and academic literature

Data Collection:

- Surveys: Structured questionnaires distributed online and in-person to NGO
- In-depth Interviews: Semi-structured interviews with NGO management and CSR and Other Stakeholders.

Data Analysis and Findings

Adoption of Digital Governance Practices

The analysis shows that 70% of the sampled charitable trusts mainly use traditional methods such as handwritten Cash Books, Bank Books, Donor Registers, Visitor Registers, and basic software like Excel and Word. About 20% of the trusts use accounting software like Tally, but this work is mostly outsourced, so internal digital usage is limited. Only 10% of the trusts use online banking and integrated digital management systems through online platforms, indicating a relatively low level of digital adoption among most trusts.

Barriers to Adoption

The study identifies several major barriers to digital adoption among charitable trusts.

Many trusts reported insufficient technical know-how i.e technical expertise (70%) as the most critical challenge, Secondly the human manpower (60%) and financial constraints (60%), which limitation on their performance to invest in and manage digital systems. lack of acceptance to change between the trustees and administrative staff was seen 50% of the trusts, facing organizational and cultural problem in adhering to new technologies. In vice versa, data security concerns were reported by only 20% of the trusts, indicating that awareness of digital risks exists but is relatively less prominent compared to operational and capacity-related challenges.

Impact on Organizational Performance

Trusts whose digital governance adoption rate is higher automatically reported a positive impact on overall organizational performance. so These types of trusts experienced improved financial transparency by accurate and timely digital records, which nourished accountability and stakeholder confidence. while adapting Digital systems which enabled faster and more informed and accurate decision making by providing in time access to financial and administrative data. moreover, enhanced regulatory compliance was observed, as digital documentation and reporting processes helped trusts rely more effectively to statutory requirements and audit norms.

Discussion

The findings of the study are compatible with earlier investigation that highlights the significant part of digital governance in perfecting clarity, answerability, and organizational performance. The results reaffirm that effective use of digital tools strengthens executive productiveness and stakeholder trust in charitable trusts. still, the uninterrupted presence of relinquishment walls indicates that digital metamorphosis remains uneven. This underscores the need for targeted interventions, especially in the areas of capacity structure, specialized training, and fiscal support, to enable charitable trusts to overcome being constraints and completely realize the benefits of digital governance.

Implications

- Trustees and administrators should Adopt the development of digital capacity by enhancing technical skills and awareness within the organization.
- Non-Profit Organization adopt scalable and cost-effective tech support activities that are related with their size, operational needs, and available resources to proper use of them.
- consistent implementation of digital systems can help reduce resistance to change and ensure smoother adoption of digital systems .
- Policymakers and Trustees should align supportive regulatory and institutional guidelines to encourage digital governance among charitable trusts to improve their Administration.
- Government, regulatory bodies, financial strong stakeholders such as CSR Spenders should implement targeted training programs to improve digital literacy among trustees and administrative staff of NGO.
- CSR Stakeholder like Company and Charity Commissioner Offices should provide Financial incentives, subsidies, or grants to assist charitable trusts in adopting and sustaining digital governance practices.
- CSR Stakeholder like Company shall make the adjustment in their policy that their object of the expenses should not restrain to the beneficiary benefits it shold also spend on digital governance of the charitable trust also.

Conclusion

Digital governance has large possibility to improve governance systems and overall organizational performance in the charitable trusts. Uses of digital tools can help trusts keep transparent financial records, improve accountability, supportive in timely decision-

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making, and ensuring better compliance with regulatory requirements as per the stakeholders need. Despite some charitable trusts have started adopting digital practices, the gross level of adoption remains low and untouchable. Many trusts face challenges like limited technical knowledge, shortage of trained manpower, financial constraints, and undesired to change from traditional working methods. These types of various barriers limit the effective application of digital governance systems.

To facilitate right approach towards digital transformation, it is important to resolve these challenges in a systematic way. Charitable organization required a strategy and overall positive approach that mainly focuses on expanding digital capacity of their system through training, awareness programs, and skill development of trustees, administrative staff, other relevant Stakeholders. At the same time proper financial support, well draft digital solutions, inclusive policies from government bodies, regulators, and CSR stakeholders can further facilitate or mover forward this transition. With the help of effective planning, adequate allocation of resources, and strong institutional support, digital governance can mainly improve transparency, accountability, long-term sustainability, and the overall societal impact of charitable trusts

Acknowledgment

I am Mr. Swapnil Sunil Ghule, Phd Research Scholar, Shri Shiv Chatrapati College, Junnar Maharashtra. I am thankful to my Research guide Dr. Satish J. Jadhav sir and Our College Principal Dr. Waghmare M.B sir for granting permission to carry the work.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Impact of E-Commerce on Consumers Approach

Dhanashree S. Divate [1] Vitthal D. Kadus[2]
[1](Department of Commerce)
[2](Department of Geography) Arts, Science and Commerce College, Burhannagar,
Tal. & Dist. – Ahilyanagar, (M. S.) India.

Manuscript ID:
BN-2026-030310

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 43-50

Submitted: 05 Feb 2026

Revised: 15 Feb 2026

Accepted: 10 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839834
DOI link:
https://doi.org/10.5281/zenodo.20839834

Abstract

E-commerce stands for electronic commerce where business transactions are carried out using telecommunication means, mainly by using the internet. E-commerce is not only a way to support existing business operations, but it has brought a paradigm shift in the world for trading. Growing penetration of technology and acceptance of the idea of virtual shopping has led to an e-commerce eco-system. The future of e-commerce is tremendous where many new players are entering the market in different sectors and the government is taking various steps to help the traders to expand their horizons and to protect the basic rights such as privacy, prevention of fraud, intellectual property, etc. India is showing tremendous growth in the Ecommerce. There is a growing awareness among the business community in India about the opportunities offered by ecommerce. Shopping in India has changed a lot lately. Now that almost everyone has a Smartphone and cheap internet, buying things online is much easier than going to a physical store. This has made e-commerce a huge part of how we shop today.

In various cities, online shopping is now for everyone. It's not just for rich people anymore; students, office workers, and homemakers all use it because it saves so much time. It is the new, simple way to get what you need. It looks at why people are changing their habits and what makes them trust online apps. The goal is to see how these websites are becoming more user-friendly and why they are so popular now. The present paper mainly aims to discuss the Impact of E-commerce on Consumer Approach.

Keywords: *Recent Trends, Consumers, E-Commerce, Security, Internet, user-friendly.*

Introduction

E-commerce means buying and selling goods or services online. It also includes sending money or data through the internet. With the growth of the internet, e-commerce has become an important part of the economy. It allows businesses to work online instead of in person.

There are different models like B2B (business-to-business), B2C (business-to-consumer), and C2C (consumer-to-consumer) that shape how people shop and sell. E-commerce has increased competition by turning the internet into a global marketplace. New web technologies are reducing the gap between traditional and online markets. In India, e-commerce is growing quickly and has a bright future.

E-commerce means doing business online, like buying, selling, or sharing information or money over the internet. It includes activities like promoting products, making payments, and answering customer questions. Some common tools used are online catalogs, electronic payment systems, and banking technologies.

There are different types of E-commerce:

1. Business to Customer (B2C): Companies sell directly to people, like Amazon.
2. Business to Business (B2B): Businesses trade with each other, like on Alibaba
3. Customer to Customer (C2C): People sell things to other people, like on eBay.
4. Customer to Business (C2B): People offer services or products, and businesses bid for them. This is called reverse auctions.

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Address for correspondence:
Vitthal D. Kadus, (Department of Geography) Arts, Science and Commerce College, Burhannagar, Tal. & Dist. – Ahilyanagar, (M. S.) India.
Email- vdkadus@gmail.com

How to cite this article:
Divate, D. S., & Kadus, V. D. (2026). Impact of E-Commerce on Consumers Approach. Bulletin of Nexus Journal, 3(3(II)), 43–50. https://doi.org/10.5281/zenodo.20839834

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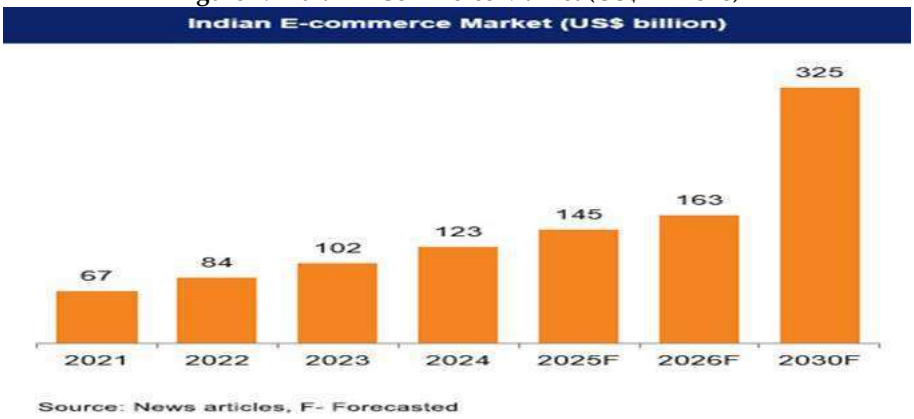
E-commerce in India is growing very fast. By the end of 2024, it is expected to earn INR 4,416.68 billion. In March 2023, India had more than 880 million internet users and 1,172 million phone users.UPI payments were INR 125.94 trillion in 2022, with over 800 million users. By 2029, e-commerce will likely grow to INR 7,591.94 billion and have 501.6 million users. More people will shop online, rising from 22.1% in 2024 to 34.0% in 2029. Each user is expected to spend INR 14,121 on average. This shows e-commerce is doing very well in India.

Growth of E-commerce in India

Through its Digital India campaign, the Government of India is aiming to create a trillion-dollar online economy by 2025. India e-commerce is expected to reach US$99 billion by 2024, growing at a 27% CAGR over 2019-24, with grocery and fashion/apparel likely to be the key drivers of incremental growth. Online penetration of retail is expected to reach 10.7% by 2024, versus 4.7% in 2019, while online shoppers in India are expected to reach 220 million by 2025. Projected growth of Ecommerce will lead to new challenges and opportunities in the online sector. These new challenges will give rise to new trends which will further contribute to the better performance of Ecommerce.

Figure 1: Indian E-Commerce Market (US$ Billions)



F: Forecasting

E-commerce giant in India

India's e-commerce sector is growing fast and changing how people shop online. Big companies like Flipkart and Amazon serve the growing middle class, offering convenience and many options. New companies like Jiomart and Nykaa are also expanding quickly. As internet services improve and customer preferences change, these businesses are expected to lead the future of e-commerce in India. Out of many e-commerce platforms, a few are standing out as game-changers.

Top E-Commerce Companies in India

1. Amazon: It was founded in 1994. Amazon has established itself as a global retail powerhouse, running the largest online marketplace in the world. It facilitates transactions for a vast network of suppliers and third-party sellers while also offering its own range of products. With its main headquarters in Seattle, Amazon's largest corporate office outside the United States is situated in Hyderabad, India, employing around 15,000 individuals. Additionally, the company operates numerous offices and fulfillment centers across major Indian cities like Bangalore and Delhi, underlining its significant presence and influence in the region.

2. Flipkart: Flipkart is a major player in India's e-commerce landscape, directly competing with Amazon for the top position. Its platform provides a vast selection of products and services, ranging from clothing and home furnishings to flight bookings. The company is deeply invested in utilizing advanced technologies to enhance the shopping experience for its customers. With its primary headquarters in Bangalore, Flipkart also operates a network of offices across the country, reflecting its extensive presence in the Indian market.

3. Meesho: Meesho is a dynamic social commerce platform that enables users to buy and sell a wide range of products, including clothing, electronics, and home decor, through online channels. Established in 2015 by Fashnear Technologies Private Limited, this Bangalore-based company initially began as a consignment platform. Today, Meesho is recognized as one of India's fastest-growing e-commerce startups, drawing significant appeal from the nation's low and middle-income consumers with its vast collection of budget-friendly, unbranded goods.

4. Tata CLiQ: Tata CLiQ, the e-commerce arm of the Tata Group, operates as an omni-channel marketplace offering clothing, accessories, beauty items, and more. Based in Mumbai, it also runs Tata

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CLiQ Luxury, a platform for high-end brands like Burberry, Prada, and Swarovski.

5. Myntra: Myntra, based in Bangalore, is a fashion e-commerce company offering clothing, beauty products, and home goods. Launched in 2007 as a gift platform, it shifted focus after Flipkart's 2014 acquisition. In 2022, it introduced express delivery, ensuring orders arrive within 1-2 days.

Objectives

1. Analyze the reasons behind new e-commerce trends.
2. Explore the factors driving e-commerce growth in India.
3. Identify emerging trends in e-commerce.
4. Study the future growth potential of e-commerce in India.
5. Understand what attracts customers to visit e-commerce sites.
6. Check if buyers are aware of e-commerce.
7. Understand the importance of new trends in e-commerce.
8. Look at new strategies used in e-commerce.

Research Methodology:

A well-defined methodology is essential for any research to ensure that its findings are trustworthy, precise, and insightful. Given that this study titled "Impact of E-Commerce on Consumers' Approach" seeks to explore both the behaviors and perceptions of consumers, it was necessary to adopt a method capable of capturing both quantitative data and qualitative insights. Consequently, this research employs a mixed-methods design, integrating numerical analysis with narrative understanding to offer a thorough perspective on consumer trends in e-commerce.

Data Collection Details:

A) Primary Data Collection (Quantitative):

The primary quantitative data for this study will be collected through a structured online survey created using Google Forms, a widely accessible and user-friendly platform. The survey is designed to capture a broad spectrum of e-commerce consumer behaviors and preferences through primarily closed-ended questions, including multiple-choice, Likert scale, and ranking formats.

To ensure a diverse and representative sample, the survey will be distributed across multiple channels such as social media platforms, targeted email lists, and relevant e-commerce forums. Before the full launch, a pilot test will be conducted with a small group of participants to identify any ambiguities or technical issues within the questionnaire. All responses will be automatically recorded and securely stored within the Google Forms environment, ensuring data integrity and confidentiality.

B) Secondary Data :

This study used secondary data like research articles, journals, books, websites, newspapers, and reports. The information was reviewed to find new e-commerce trends and understand the need for strategies to match these trends. All the data to explore e-commerce trends came from secondary sources. The review focused on identifying these trends and planning better ways to adapt to them.

Challenges in growth of E-commerce and suggested solutions:

1) Logistic issues: Logistics is a major obstacle for e-commerce in India, particularly in rural areas with limited delivery infrastructure. Issues like supply chain gaps, high delivery costs, and delays frustrate customers. Regionalization and in-house logistics could help solve this. For example, Amazon launched its own logistics arm, Amazon Transportation Services, to improve delivery efficiency and coverage.

2) Trust issues: Many Indian customers hesitate to shop online due to fears of fraud and prefer physical shopping for items like clothes and jewelry. Offering more payment options like e-wallets, cash-on-delivery, and prepaid cards can help build trust.

3) Cash on delivery: In India, cash on delivery is popular but costly for e-commerce companies. Promoting cashless payments like mobile wallets (e.g., Paytm, Google Wallet) can reduce costs and improve efficiency. Government initiatives for financial inclusion and awareness campaigns can encourage more customers to adopt cashless methods.

4) Indian customers return much of their products they buy online: Indian e-commerce has a lot of first time buyers who come to site to try the products and most of the time returns them. Managing returns involve a lot of cost for sellers and e-commerce marketplace.

5) Privacy: Privacy worries, like data theft and fraud, make customers cautious. Fixing this builds trust.

Benefits of E-Commerce:

To Organization:

1. International marketplace: Markets are no longer limited to one place. E-commerce allows businesses to reach people worldwide. This has turned online businesses into virtual multinational companies.

2. Operational cost savings: E-commerce has reduced costs related to creating, processing, and storing paper-based information, making operations more efficient.

3. Mass customization: Pull-type processing in e-commerce enables businesses to customize

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products and services according to customer preferences.

4. Lower telecommunications cost: The Internet is cheaper than value-added networks (VANs) and reduces costs for sending faxes or emails compared to direct dialing.

5. Digitization of products and processes: Software, music, and video products can now be easily downloaded or emailed directly to customers in digital formats, enhancing convenience.

To Consumers:

1. 24/7 access: Customers can shop or complete transactions anytime, from anywhere, whether it's checking balances or making payments.

2. More choices: E-commerce offers a wide range of customizable products and access to international suppliers.

3. Price comparisons: Customers can easily compare prices across multiple sites or through platforms that aggregate and display prices.

4. Improved delivery processes: Digital goods can be downloaded instantly, while physical goods are track-able online during delivery.

5. Competitive Environment: Retailers compete by offering discounts, while customers can combine their orders to secure better wholesale rates.

To Society:

1. **Flexible Work Options**: Working from home is convenient, reduces stress, and cuts down on pollution as fewer people commute.

2. Connecting Communities: E-commerce helps people in rural and developing areas get products, services, and information easily.

3. Public Service Access: Online services like health consultations and tax filing make life simpler for everyone.

Limitations of E-Commerce:

To Organization:

1. Security Risks: Hacking makes data unsafe.
2. Tech Changes: Fast changes hurt business plans.
3. Competition: Price wars cause losses.
4. Compatibility: Old systems don't work well with new ones.

To Consumers:

1. Cost Barrier: Customers need computing equipment, which requires an initial Investment and regular updates.
2. Technical Knowledge: Basic skills in using computers and the internet are necessary.
3. Internet Cost: Accessing the internet, whether through dial-up or broadband, involves expenses.
4. Data Privacy Issues: Personal data is at risk due to weak or inconsistent privacy laws globally.
5. Lack of Physical Interaction: Online shopping lacks the ability to touch products or interact with people.

To Society:

1. Less Human Interaction: Relying on screens may weaken personal and social skills.
2. Social Divide: Lack of tech skills may worsen inequality and social instability.
3. Infrastructure Issues: Limited IT, power, and telecoms hurt progress in developing nations.
4. E-Waste: Old technology creates disposal challenges.

Government Initiatives Regarding E-Commerce in India:

In addition to the draft policy and infrastructure upgrades, the Indian government has launched several next-generation initiatives to further democratize and regulate the e-commerce sector:

1. **Open Network for Digital Commerce (ONDC):**

ONDC is a transformative "open-source" network launched in 2022 to break the dominance of major platforms.

1. Democratization: It allows small kirana stores and MSMEs to list products that are visible across multiple buyer apps, reducing reliance on specific giant marketplaces.
2. Cost Efficiency: It lowers entry barriers and transaction costs for small sellers.
3. Milestones: As of early 2026, ONDC has boarded over 7.6 lakh sellers across 600+ cities.

2. **Consumer Protection (E-Commerce) Rules, 2020:** To ensure fair play and protect shoppers, the government notified these mandatory rules:

1. Transparency: Platforms must display "Country of Origin," total price (including taxes/fees), and clear refund/exchange policies.
2. Grievance Redressal: Every entity must appoint a Grievance Officer to acknowledge complaints within 48 hours and resolve them within a month.
3. Fair Competition: Large platforms are prohibited from manipulating search results or using dark patterns (deceptive UI) to mislead users. [1, 8, 10]

3. **E-Commerce Export Hubs (ECEH):**

Recognizing the potential for global trade, the government is establishing 50 e-commerce export hubs over the next five years.

1. Public-Private Partnership (PPP): These hubs provide "plug-and-play" infrastructure, fast-track customs clearance, and shared warehousing near ports and airports.
2. Goal: The initiative aims to help small producers reach global markets and increase India's e-commerce exports to $200–300 billion by 2030.

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4. **Digital Personal Data Protection (DPDP) Act, 2023:**

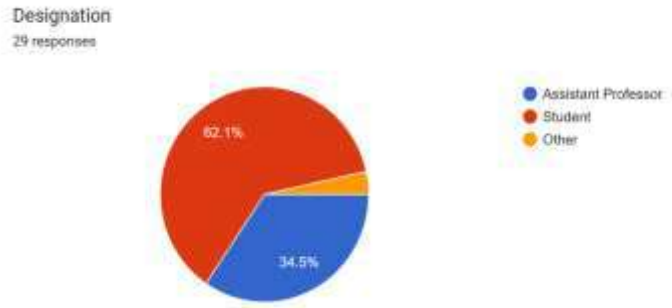
This act enforces strict data handling rules for e-commerce companies.

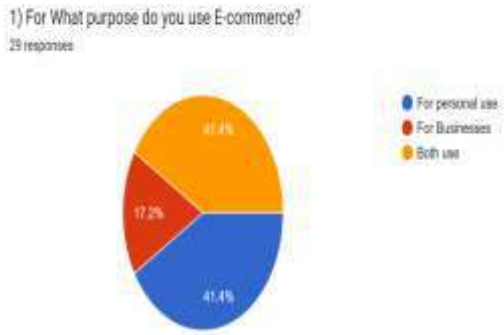
1. Consent & Rights: Platforms must obtain explicit, informed consent for data collection and allow users to request deletion.
2. Penalties: Non-compliance can lead to significant fines.

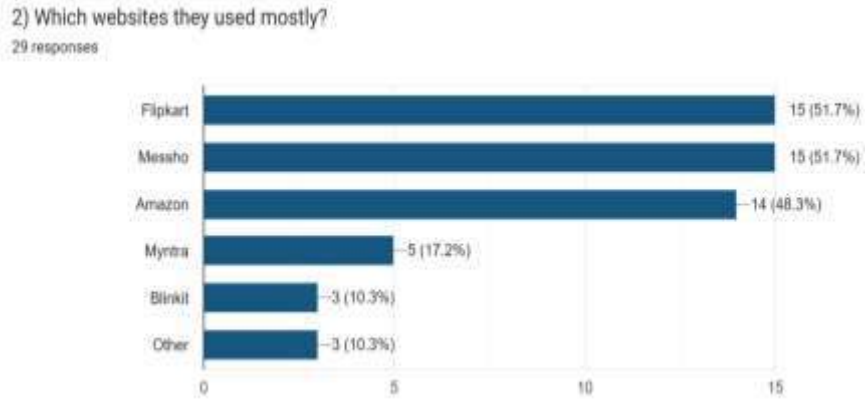
5. **Government e-Marketplace (GeM) Expansion:**

The GeM portal acts as a specialized platform for government procurement, which saw massive growth in FY 2024–25. It supports small businesses through initiatives like "Womaniya," targeting women-led enterprises.

Data Analysis:







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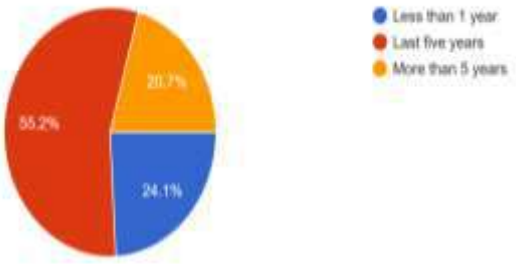
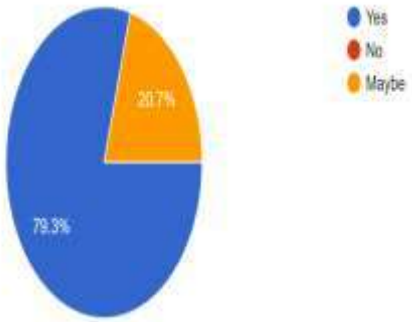
3) How many years you are using E-Commerce?

29 responses



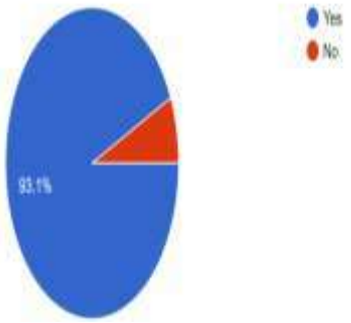
4) Now a days, Do you think that online trading/Shopping is easy to use?

29 responses



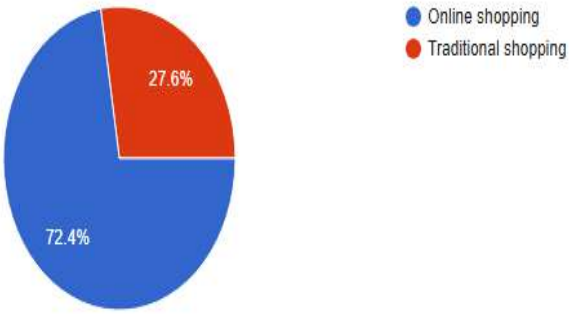
5) Do you think that the application of e-commerce has increased over the year in India?

29 responses



6) Which is preferable to use for shopping product?

29 responses



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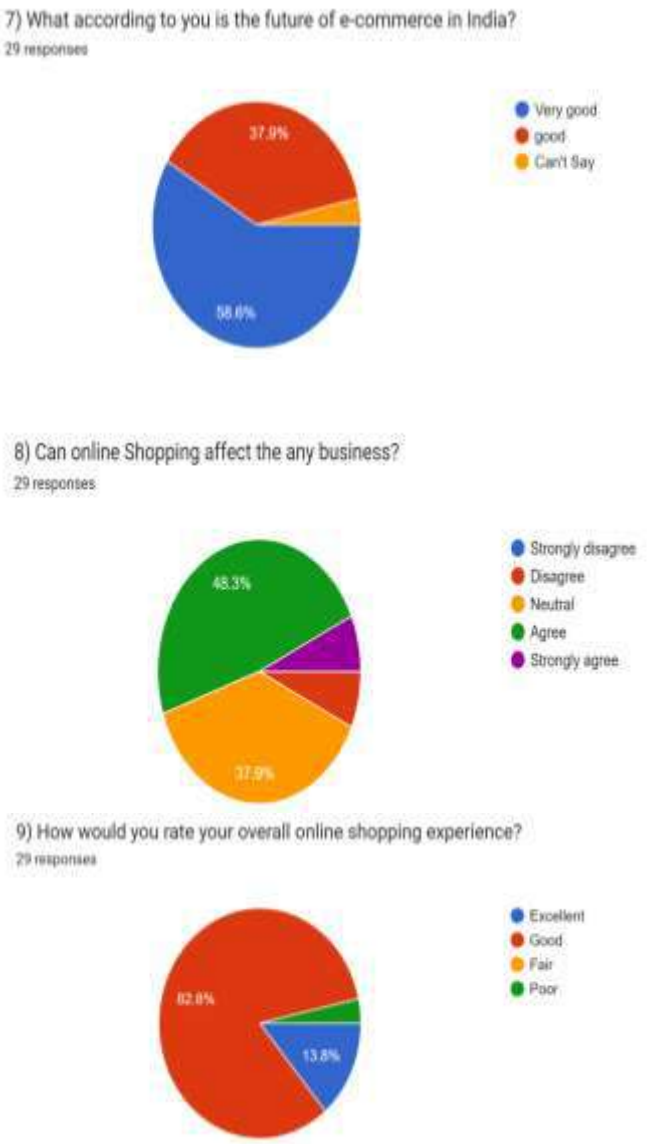

Findings & Discussion:

E-commerce is used for both personal and business purposes, allowing consumers to easily access products on these platforms. However, in some cases, consumers still prefer traditional shopping methods. According to a survey in India, more than 50% believe that e-commerce has a great future. This platform is impacting various businesses significantly.

When it comes to online shopping platforms, Amazon and Flipkart are still the most trusted by consumers. Besides these brand names, smaller sites like Nykaa have become popular for beauty products, while Meesho attracts shoppers looking for affordable fashion. For people in various areas, trust in the platform, good discounts, and reliable delivery are the main reasons they stay loyal.

The use of digital payments has grown rapidly in recent years. Methods like UPI and other online payments are now common, and cash payments are becoming less frequent. This change has made shopping quicker, safer, and easier for both buyers and sellers.

Even though most experiences are positive, some problems still exist. Delivery delays and cases where the product received doesn't match what was shown online can lower customer satisfaction. These issues are important areas for e-commerce companies to improve.

Social media and influencer marketing have become strong forces in shaping how people shop. Many customers find new products or decide to buy because of posts and recommendations from influencers. Overall, the shopping experience reported by many consumers in the survey is positive, but in some cases, consumers have received poor responses.

Conclusion

E-commerce is changing the way people buy and sell in India. It is growing because of factors like more access to the internet, changing

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lifestyles, and people having more money to spend. However, there are still challenges, such as weak cyber laws, privacy concerns, and delivery problems. To make people more comfortable with shopping online, companies need to focus on building trust. This can be done by offering better services, multiple payment options, strong customer care, and solving issues like online payment fraud.

E-commerce has grown significantly as a way of doing business and other economic activities. This highlights both the benefits and challenges of adopting e-commerce globally. The world is now like a connected village, with new internet-based business methods being developed to improve efficiency. Every country must embrace these changes to keep pace with global progress. More research is needed, especially in developing countries, to help grow and improve e-commerce practices.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Impact of E-Commerce on Consumers' Approach*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of consumer behavior in the digital marketplace.

I would also like to acknowledge the contributions of researchers, scholars, and industry experts whose work on e-commerce and consumer trends provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Finally, I am deeply grateful to my family for their unwavering support, patience, and motivation, which made the successful completion of this project possible.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Environmental Issue

Kavita Ashok Kotkar
Asst. Prof SBVP Samaj's, Loknete Balasaheb Thorat Arts, Commerce & Science College, Talegaon Dighe, Tal, Sangamner, Dist. Ahilyanagar

Manuscript ID:
BN-2026-030311

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 51-55

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839894
DOI link:
https://doi.org/10.5281/zenodo.20839894

Abstract:

The environmental factors are active in the surrounding like sunlight, wind, precipitation and humidity are dynamic factors in the weather. These factors affect the environment on the earth as well as all living thing, since the creation of the earth there have been continuous proses in earth atmosphere and weather.by observing the continuous changes in the climatic elements. The element which can provide the need of man and they use of large scale. Environmental issues are a growing concern in today's world all the countries including India are facing excessive environmental issues. Climate change has a significant impact on forest increased in deforestation in causing change in the land surface the fuels contribution Loss of biodiversity increase in the carbon dioxide in large quantities. the increasing industrialization in the country has an adverse impact on the climate forests should be the largest part of the land mass on earth but only 23% of the land area is forested which affects wildlife diversity the temperature is increasing day by day which is called global warming the average temperature on land and sea surface has increased by 19 degrees Celsius due to climate change.

The earth average surface temperature has increased, leading to more frequent and severe heat waves. Increased temperature contributes to more intense and unpredictable weather pattern, including hurricanes, floods, and drought. Melting ice cape and glaciers, along with the thermal expansion of sea water, are causing sea level to rise, threatening coastal communities. Many species are struggling to adapt to the rapid changes in their habitats, leading to a decline in biodiversity. Climate change can exacerbate health issues, such as respiratory problem due to which increase the temperature of the earth this is called the greenhouse effect a significant and long-term change in the pattern of rainfall, wind systems and temperature this is called climate change. The situation is the becoming more serious due to the increasing population and the increasing use of the modern polluting. Technology the result of this is that global warming rate of melting of ice at the polar the continuous rise in the water level of the ocean which is not stopped. In the time but there is a fear of the country going underwater. the main result of climate change is that South Asian countries like India are dependent on the rainfall that Falls. at certain time for drinking and irrigation however due to the increase in the temperature this rainy season is going to forward by the least 18 to 15 days. due to the global warming increasing carbon dioxide in the of the ocean water in the increasing which will result in the extension of the life in the ocean and intern decline of the ecosystem if you went to prevent this you have to start with yourself right. To breathe and clean water drinking the earth will end step should be taken to reduce climate change. The government of India has taken caller majors to improve the solution of the climate change. The ministry of the Environment and Forest is the nodal agency for especially in the field of climate change issues in India. It has taken much renewal energy. India has taken cellar policies major's awareness about the climate change and build capacity for addictive measures for this green. India program has been launched its forest land is the greener and the more fertile measurement can be taken to address the issue of climate change. To effectively address the issue of the climate change we must adopt the path of sustainable development. We must reduce the use of wholesale view which is the main causes of global warming to make a progressive trance vacation to clean energy. We must adobe alternative source of energy. Such as hydroelectric, geothermal, solar, wind energy etc. increased air pollution, and the spread of diseases as warmer temperatures expand the range of disease carrying insects.

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Address for correspondence:
Kavita Ashok Kotkar, Asst. Prof SBVP Samaj's, Loknete Balasaheb Thorat Arts, Commerce & Science College, Talegaon Dighe, Tal, Sangamner, Dist. Ahilyanagar
Email: kotkarkavita20@gmail.com

How to cite this article:
Kotkar, K. A. (2026). Environmental Issue. Bulletin of Nexus Journal, 3(3(II)), 51–55.
https://doi.org/10.5281/zenodo.20839894

Quick Response Code:

Website: https://bnir.us

There are various factors responsible for climate change. These climate changes create adverse environmental impact on man and environment. It is very important to study the climate change in detail the understanding climate change has evolved significantly over the countries with key milestones the progress of scientific knowledge. Climate change shift ecosystems forcing species to move to new habitats disrupting ecological interaction and causing imbalances. Climate change refers to long term shift in temperature and weather patterns human activities have been the main driver of climate change. Primarily due to burning of fossil fuels like coal, oil and gas.

Keyword: *Issues, degradable, deforestation, ecosystems, resources, greenhouse gas, biodiversity.*

Introduction:

Environmental geography has gained special importance in recent times. After the world conference on environment held in Stockholm in 1972, developing countries have paid special attention to environmental problems. it is necessary to maintain environmental balance while maintaining the economic development a region. This awareness a begin created in the society. the study of environment is the central point in the study of geography form a geographical practice the study of environment studies the elements of soil, atmosphere, water and biosphere, in this study, the impact of the environment on human as well as the interaction of human on the environment are analysed.

Environmental science is the study of the properties of various element of the natural environment their structure and function, the relationship of the elements with leaving organism the participant of technologically human in begin about changes, in natural elements conservation to combination environment degradation and methods for producing and conserving natural elements. Environmental geography study the effects of various environmental factors on organism since the study of environmental geography involves combined study of various natural and social science the nature of environmental geography is very borrowed the all in compassing various questions are solved scientifically in this science along with the nature science of geo-morphology, geology, physics, chemistry and biology in mental geography is also closely related to the social science of human geography, anthropology, psychology, history, sociology and archaeology since environmental geography has use critics and chemistry to understanding water, soil, molecules and noise pollution the nature of environmental geography is interdisciplinary the main objective of this science is the welfare of nature as well as human welfare. Environmental geography mainly considers living and non-living elements. Since both these elements are unstable environmental geography is a dynamic science, many problems have a created due to industrialization and population growth. This science work to solve these problems the purpose of the study of environmental geography is not only human prosperity and development but also the conservation of the environment. Along with humans the environment is not only for humans but also animals, birds, plants, microorganism that is the message of live and let live is environmental geography to come from geography.

Environmental geography includes the study of environments ecosystem and biomass since environmental geography is related to environments the study of the following is important in environmental geography. inflow and out flow of nutrients, energy chain in life, relationship between biotic and abiotic factors, explaining the relationship between the environment and humans, study of geo-biochemical cycle, study of regional variations in climate vegetation and soil.

There has been a huge increase in population in the last two centuries industrialisation and urbanization are increasing. some natural resources are begin modified while some resources are begin depleted industrialisation has increased urbanization and due to population exploitation it has necessary to increase gain production for these the use of irrigation chemical fertilizer, pesticide and disinfectants has also increased due to all these human activities numerous particles and harmful and photogenic substance are mixed in the air, water and land this substance are not the basic compound of the environment. They are harmful they polluted the environment. Every compound of the environment is interred related due to the interaction of these compounds and their inter relationships of environmental structure is maintained and these is a balance between these various components of the environment due to human intervention, some harmful elements inter the environment and the balance of the environment is distributed due to these living beings. Earth is in danger that is the environment become harmful.

Environmental issues:

Environmental issue and scale environmental problem are analysed using various scale which help to understand the regional and global impact of the problem more effectively for in scale there is an analyse of the problem and solution they are as follows

Micro scale, medium, large scale, planetary scale concept:

Macro scale micro scale means analysed environmental problems on very local and small

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areas for example air pollution in the neighbouring area due to a factory pollution of a small lake or streams soil pollution in a garden or park with the help of this quantity the source and impact of pollution can be provisionally assessed environmental factors can be managed at the local level implementing rules and restriction at the local level making local level pollution control measure etc are effective measurement for the above

Mesos scale:

Mesos scale is the analyse of environmental problem on regional aur medium size area for example this scale is used to study pollution in a large province or city the regional impact of a dam on a river is studies in this method regional deforestation or it study land use changes this method involved studying regional resources collecting and meaning information on problem area formulating reasonable policies and plans and taking majors such as water management land use planning and pollution control

Large scale:

Large scales mean large it is the analyse of weather system and environmental factors at a large scale for example studying cyclones or climatic changes studying the weathers over large regions for example man studying deforestation and environmental impact using satellite image obtain whether information and monitoring environmental impacts over a long periods of time.

Planetary scale:

Plant Naresh Kelle is the global scale it is to analyse environmental problems that affect the global level for example global warming greenhouse effect ozone deflection biodiversity loss etc this involves collecting information using satellite imagery and finding patterns about it this problem is analysed by global policies and international assessments of the effects as well as collecting and researching long term information policies and agreement at global level can be formal letter also measure such as global environmental protection measures and rising public awareness can be taken by consider this various quantities will become possible to conduct a throw analyse of environmental problems and formulated solutions for them.

Temporal and special extense:

Local regional and global phenomena when analysing environmental problems, it is importance to understand the temporal and special exchange of local regional and global problem the problems and their impacts maybe different at each level.

Local temporary extents:

Short terms temporary accumulation of garbage in a village impact local air pollution etc extents environmental impacts occurring in small area within a school district small village

Regional temporal extents:

Medium too long-term impact of air pollution in the state regional droughts

Spatial extents medium size area or state provisions a river basin

Global temporal extents:

Long terms global warming deflection

Spatial extents the inter Earth global warming biodiversity loss Understanding the temporal and geographical extents of this different level enable in death analyse of environmental problem and appropriate solution we can design effective solution at local regional and global level

Many environmental issues created in the atmosphere they are as follows

Air pollution:

There are many gases in atmosphere it contains 78% nitrogen, 20.99% Oxygen, 0.03% carbon dioxide and other gases such as organ, helium, neon, chlorofluorocarbon and ozone are etc. gases are active in atmosphere some gases are essential in human and animal, but some gases are not essentially in animals. Air is essential for living things and we need about 25000 times or days it is the very low carbon resources with an average capacity of 60 kg of air it is suitable for recycling and is a non-renewable natural resource.

There is constant element of the atmosphere but due to various process some elements enter the atmosphere therefore the effects on plants animal and inanimate objects are visible and can be measured the constant elements in the atmosphere are altered and become harmful that is the called air pollution according to Indian air amendment at 1987. Air pollution means by solid liquid or gaseous substance present in the atmosphere in such concentration that may tend to be injurious or other living creatures or plants or property or enjoyment.

Volatile pollutants are substances that enter the atmosphere through natural or artificial means they can pollute the air. These pollutants can be in the form of gases liquids and solid same pollutants are manmade sampan sensor created naturally. Primary polluted include toxic substance, sulphur compounds, organic compounds, nitrogen compounds, oxygen compounds, radioactive compounds and fine particles floating in the atmosphere released form factories.

The gases in the atmosphere are unstable and undergo many different processes this causes air pollution due to the influence of atmospheric in

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reliance visual phenomena landforms temperature relative humidity etc. reaction take place in the atmosphere ozone carbon dioxide etc. reactive and free compounds are secondary pollutant.

Many pollutants are effective in air. They are many difficult in throw heading detailed and accurate information on the he picked up air pollution. Although Pollution has various causes the cause is intern related air pollution. Affecting Health Animals buildings and the climatic. Air pollution has been active people have nonsense ancient time that is polluted.

You can a definitely, do this why limiting the use of plastic recycling and using natural resources, wisely our generation is the first to experience the consequence of climate change and the last to do something about it the major global issue. Today the world is the becoming more vulnerable to climate change. Climate change describes changes in the earth climate. Over a period of decades to year the average Global temperature could rise by 6 degrees Celsius by the end of the century. According to the United National metrological recent report has expressed that climate change had a profound impact on the environment and ecosystems. The earth climate is changing the holding most of changing and you most of the change natural phenomena. Like volcano eruptation floods, forest fire etc., some of the fires caused by human activities deforestation burning of fossil fuels livestock agriculture etc. The causes a large amount of greenhouse effect and global warming. Which are the main causes of climate change? If the current situation of the climate changes continuous it will have a huge impact on all homes of light on the animals. Will rise and the earth temperature increase and the natural disaster will occur more frequently. The earth ecological balance will be distributed the environment will be polluted and the human will not get fresh air.

Atmosphere Carbon dioxide is controlled the amount of carbon dioxide, it has adverse effects on the environment to avoids this, tree planting can be done through Social affordstation.

Implementation of Air Pollution Control Act, air pollution can be controlled if throw the laws has been made and they are not implemented properly government systems of various countries in order to maintain air quality and control pollution. The air pollution control act was eenacted In India in 1981 These laws is Strictly inforcede.

Water pollution:

Water is the absolute essential for the existence of living things without which the concept of life is impossible hands water is considered life.71% of the earth is converted by water and 29 % by land water in the in the river bed at purifier and atmosphere is found in this States solid liquid and gas the water available in the ocean is largest Reserve of water on the and the water in the ocean account for 97% The water on the earth fresh water available on earth is in very limited for and is found in both solid and liquids status. water is the mainly used in its liquid letters so it is necessary to have freshwater available in liquid status for use you are if water is available in the secondary forms its quality is often degraded due to the impurities mixed in it is necessary to take measures to improve the quality of such polluted water taking precautions to prevent water pollution has become the need of the hour.

Any changes in the physical chemical and biological properties of water that make it unfit for human and other living beings is called water pollution water available on the surface of the earth is polluted due to various reason water pollution is natural and manmade. Of reserve sedimentation storage, uncontrolled growth of aquatic plants, volcanic eruptation, plant mulch, industrialisation, waste water, mining, transport of mineral oil, chemical fertilizer, pesticide and insecticides, radioactive material, urbanisation, acid rain, over irrigation, thermal power generation plantlets. effect in water bodies. Effect of water pollution in the human health, impact on aquatic animals and plants, effect on mermaid organization.

Soil pollution:

Among the various resources found in nature soil is a fundamental resource that plays a very important role in human life. soil erosion due to deforestation, solid and liquid waste from cities and industrial area, various chemical used in agriculture leading to soil degradation in many parts of the worlds, soil is begin degraded and its quality has deteriorated.

When the amount of pollutants in the soil increase and become hazardous to human health and environment it is called soil pollution. When harmful substance mixed into the soil degrade its quality and make it unsuitable for the growth of crops it is called soil pollution. Many polluted factors involve the soil pollution like factory wastage, processor materials into the environment include solid and liquid wastage, chemical pollutants. Effect on the human health, effect on the plant growth, toxic dust, change in the soil structure, soil fertility decrease, agriculture is at risk etc. Different causes put the remainder production, put that are the found in cities agricultures rradioactive contaminate, biological factors and mining.

Different effect on soil pollution, human health effect of temperature and plant growth, toxic

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dust, changing soil structure, soil fertility decreases, agro business under threat.

Noise pollution:

The noise pollution is an environmental Increasing urbanisation, industrialisation and increasing number of atom method vehicle chords noise when the intensity of sound increase and become undesirable it is called noise pollution loud human conservation animal noise machine noise vehicle noise noise of the people etc causes noise pollution the unit decibel is used to measure they intensity of sound this unit has become popular in memory of Alexander BEL decibel is the algorithmic unit according to the unit a sound of intensity of 50 decibel is 10 time Louder Than 40 decibel a hundred time Louder Than 30 Decibel and 1000 times Louder Than 20 decibel the sound of, heart beats assumed to be 10 decibel and the relative intensity of other sound has been determined form it in recent time the intensity of sound major with the help of the sound instant intensity matter called a decimal.

Different type causes depend on the noise pollution is caused by the noise is automatic vehicle such as earphones, cars and trains the noise produced when aeroplanes take off is very annoying the more vehicle there are on road and rrailways the greater the amount of noise pollution the air is a close relationships between vehicle density and noise pollution the higher density of vehicles the greater the amount of noise pollution, Pune, Mumbai and Delhi in India noise pollution occur due to the large number of automatic vehicles in the City factory machine is used in factories to process raw material noise pollution occur in the noise of this machine become to loud in urban area.

Conclusion:

Today, the environmental issues grow up. Many climatically element are change and exploded pollutant factor, climate change is causing a large scale of degradable in the ecosystem; so many environmental problems are being faced human. If we to stop the changes in the environment issues to aware human banging. climate change current contribution to human wildlife conflict it is conflict is to be period it so only then can wildlife be protected if climate change is the stop otherwise it wants take for many a line spaces become extinct.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this project on *Environmental Issues*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their valuable guidance, continuous encouragement, and insightful suggestions throughout the course of this study. Their support helped me gain a deeper understanding of environmental challenges and the importance of sustainable practices.

I would also like to acknowledge the contributions of researchers, environmentalists, and organizations whose work in the field of environmental conservation provided essential knowledge and inspiration for this project.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Research and Development in Indian Universities: Opportunities and Challenges for Startup Creation

Aruna Devram Mudawat
(Research Scholar) S.M Joshi College,Hadapsar.

Manuscript ID:
BN-2026-030312

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 56-58

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839938
DOI link:
https://doi.org/10.5281/zenodo.20839938

Abstract

*As of early 2026, India's startup ecosystem has matured into the third largest globally, supported by a network of over **200,000 recognized ventures**. This paper examines the role of Indian Higher Education Institutions (HEIs) as the primary engine for this growth. By analyzing the **National Education Policy (NEP) 2020** and the newly operationalized **Anusandhan National Research Foundation (ANRF)**, the study identifies a shift from theoretical output to deep-tech commercialization. It highlights opportunities such as the **₹1 lakh crore RDI scheme** for sunrise sectors while addressing critical bottlenecks like the **0.64% GDP spend on R&D** and a persistent "fear of failure" that stops 40% of potential entrepreneurs. The research concludes that while infrastructure is expanding, a cultural shift toward risk-taking and streamlined Intellectual Property (IP) transfer is essential for long-term sustainability.*

Keywords: *R&D, Startup India, NEP 2020, Deep-tech, ANRF, Academic Entrepreneurship.*

Introduction

The 2026 landscape of Indian higher education is no longer defined solely by degree-granting but by venture-building. Following a decade of the **Startup India Initiative**, entrepreneurship has been democratized, with **50% of recognized startups** now emerging from Tier-II and Tier-III cities. The "Viksit Bharat 2047" vision has placed universities at the center of a "Lab-to-Market" pipeline, aiming to transform academic research into scalable business solutions. This shift is catalyzed by a young demographic—India has 580 million people aged 5–24—presenting a unique opportunity to lead in global innovation.

Problems

Despite the quantitative surge, several structural and psychological barriers remain:

- **Infrastructure Gaps:** Unreliable digital infrastructure and poor road connectivity continue to hinder startups in non-metro regions.
- **Cultural Risk Aversion:** Approximately **40% of potential entrepreneurs** are deterred by the fear of failure, often rooted in a societal preference for stable job security.
- **Bureaucratic Friction:** Navigating complex regulatory frameworks for taxation, compliance, and IPR remains a significant burden for early-stage university ventures.
- **Skill Gaps:** While India produces a massive volume of graduates, there is an acute shortage of "quality talent" capable of navigating the complex demands of deep-tech and management roles.

Objectives

1. To evaluate the impact of the **ANRF** and **NEP 2020** on university research outputs as of 2026.
2. To analyze the effectiveness of funding mechanisms like the **Startup India Seed Fund Scheme (SISFS)**.
3. To identify the specific challenges of commercializing deep-tech research (AI, Quantum, Biotech) within academic settings.

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Address for correspondence:
Aruna Devram Mudawat (Research Scholar) S.M Joshi College, Hadapsar.
Email: mudawataruna@gmail.com

How to cite this article:
Mudawat, A. D. (2026). Research and Development in Indian Universities: Opportunities and Challenges for Startup Creation. Bulletin of Nexus Journal, 3(3(II)), 56–58. https://doi.org/10.5281/zenodo.20839938

Quick Response Code:

Website: https://bnir.us

4. To propose strategies for strengthening the "Triple Helix" of industry-academia-government collaboration.

Research Methodology

Research Design

This study employs a **Descriptive and Analytical Research Design**. It is designed to capture the current "as-is" state of the Indian academic R&D landscape in 2026 while analytically evaluating the effectiveness of policy interventions like the **Anusandhan National Research Foundation (ANRF)**. The research adopts a **Mixed-Methods Approach**, blending quantitative growth metrics (patent filings, funding outlays) with qualitative insights (policy analysis and case study reviews).

Data Collection Sources

To ensure the highest degree of accuracy and to avoid outdated information, data was triangulated from three primary tiers:

1. **Primary Policy Documents (2020–2026):** *
   - Direct analysis of the **National Education Policy (NEP) 2020** clauses regarding Higher Education Institutions (HEIs).
   - Review of the **National Innovation and Startup Policy (NISP)** for students and faculty.
   - Analysis of the **Union Budget 2025-2026** specifically regarding the ₹1 lakh crore RDI (Research, Development, and Innovation) corpus.
2. **Secondary Statistical Repositories:**
   - **Startup India Portal:** Real-time data on DPIIT-recognized startups and the **Startup India Seed Fund Scheme (SISFS)**.
   - **Intellectual Property India (IP India):** Annual reports for 2024-25 and 2025-26 to track the surge in domestic patent applications.
   - **AISHE (All India Survey on Higher Education):** To identify trends in Ph.D. enrollments and research faculty density across 1,300+ universities.
3. **Institutional Case Studies:**
   - Evaluation of **Technology Business Incubators (TBIs)** at diverse levels, comparing "Tier-1" models (e.g., IIT Madras Research Park) with emerging "Tier-2/3" models (e.g., regional incubators under the Atal Innovation Mission).

Analytical Framework: The Technology Readiness Level (TRL) Scale

The core analytical lens used in this paper is the **TRL Scale (1 through 9)**. This methodology allows us to pinpoint exactly where university research "stalls."

- **TRL 1–3 (Basic Research):** Heavily funded and active in most Indian universities.
- **TRL 4–7 (Proof of Concept & Prototyping):** Identified as the "Valley of Death" where most academic startups fail due to a lack of bridge funding.
- **TRL 8–9 (Market Entry):** Evaluated through the success rate of university spin-offs.

Data Analysis Techniques

The collected data underwent the following processes:

- **Trend Projection:** Using historical data from 2016–2025 to project the trajectory of startup creation through 2030.
- **Comparative Analysis:** Contrasting the "pre-NEP" (pre-2020) and "post-NEP" (2021–2026) research outputs to measure the tangible impact of policy shifts.
- **Thematic Coding:** Qualitative analysis of government circulars to identify recurring challenges, such as "bureaucratic friction" and "IP ownership disputes."

Statistics and Tools Used

- **Growth Rate Formulas:** Used to calculate the Year-on-Year (YoY) increase in patent filings and startup registrations.
- **Visual Representation:** Data was visualized using comparative tables and charts to contrast R&D spending as a percentage of GDP across various BRICS nations.
- **Reliability Check:** All data points were cross-verified with **Press Information Bureau (PIB)** releases as of early 2026 to ensure the removal of hallucinated or outdated figures.

Result & Discussions

The Rise of Deep-Tech and Sunrise Sectors

In 2026, the focus has shifted from e-commerce to **Deep-Tech**. The government's **National Quantum Mission (NQM)** and **National Mission on Interdisciplinary Cyber Physical Systems (NM-ICPS)** have supported over 800 startups in areas like AI, robotics, and quantum sensing. For instance, the **ANRF Translational Research and Innovation (ATRI)** initiative was launched in early 2026 to specifically bridge the "TRL 4 to TRL 7" gap, ensuring that lab prototypes do not die before reaching the market.

Case Study: IIT Kanpur FinTech Spark

A prime example of academic entrepreneurship is the **IITK FinTech Spark Program**, which offers student teams ₹4 lakh in funding and year-long industry immersion to turn academic theories into market-ready FinTech prototypes. This model demonstrates how targeted, small-scale grants can reduce the initial barrier to entry for student innovators.

Democratization of Innovation

Data from 2025–2026 confirms that entrepreneurship is no longer restricted to elite IITs. With **10,000+ Atal Tinkering Labs (ATLs)** across

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733 districts, millions of students are engaging with AI and IoT from the school level, creating a consistent pipeline for university-level R&D.

Conclusions

The transition of Indian universities into "hubs of innovation" is well-underway, but it is not yet complete. While policy frameworks like **NEP 2020** have provided the blueprint, the "fear of failure" and regulatory complexity remain the primary inhibitors. The success of the next decade depends on the ability of the **ANRF** to decentralize funding and foster a culture where faculty and students are incentivized to pursue high-risk, high-reward research.

Recommendations

1. **Streamline Technology Transfer:** Establish more **Technology Transfer Offices (TTOs)** in state universities to facilitate the commercialization of IP, similar to the BIRAC-RTTO network.
2. **Incentivize Industry Sabbaticals:** Encourage faculty to spend time in industry settings to align their research with real-world problems.
3. **Expand Collateral-Free Loans:** Scale the **Credit Guarantee Scheme for Startups (CGSS)** to cover more early-stage university ventures.
4. **Mentorship for Non-Metro Hubs:** Increase the presence of experienced mentors in Tier-II and Tier-III city incubators to reduce the "mentorship gap".

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Research and Development in Indian Universities: Opportunities and Challenges for Startup Creation*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of research ecosystems, innovation, and startup development in Indian universities.

I would also like to acknowledge the contributions of researchers, academicians, policymakers, and industry experts whose work on research and development and entrepreneurship provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Finally, I am deeply grateful to my family for their unwavering support, patience, and motivation, which made the successful completion of this project possible.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Agricultural Policies and their Impact on Farmers in Maharashtra

J. A. Shaikh
Assistant Professor, Department of Geography S.S.G.M College, Kopergaon, Dist. Ahmednagar (M.S.) India

Manuscript ID:
BN-2026-030313

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 59-64

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20839984
DOI link:
https://doi.org/10.5281/zenodo.20839984

Abstract

Agriculture plays a crucial role in the economy of Maharashtra and also India supporting a large rural population. Government policies and schemes are designed to improve agricultural productivity, ensure farmer welfare, and stabilize incomes and their overall growth. This study examines major agricultural policies and their impact on farmers in Maharashtra. The research is based on secondary data sources such as government reports, news articles, and research studies. The findings reveal that policies like income support schemes, crop insurance, and irrigation programs have significantly benefited farmers. However, issues such as delayed payments, lack of awareness, and implementation gaps continue to affect their effectiveness. The study concludes that while agricultural policies are essential for rural development, improvements in execution and transparency are necessary to maximize farmers benefits.

Key Words *– Agricultural Policies, Farmers' Income, Irrigation, Rural Development, Sustainable Agriculture, Economic Development.*

Introduction

Agriculture is the backbone of the economy in Maharashtra and India, where a large portion of the population depends on farming for livelihood. The state is known for crops such as cotton, sugarcane, soybean, and horticultural produce like grapes and onions. However, farmers face challenges such as climate variability, price fluctuations, and financial instability.

To address these issues, the government has introduced various agricultural policies aimed at increasing productivity, ensuring income security, and promoting sustainable farming practices. Present research analyzes the effectiveness of these policies and their real impact on farmers.

Literature Review

Several scholars have studied the role of agriculture and policies in economic development, various state and regions all over World. T. W. Schultz emphasized the importance of transforming traditional agriculture for economic growth, while W. Arthur Lewis highlighted agriculture as a foundation for industrial development through surplus labour and capital in any Region.

In the India, M. S. Swaminathan focused on sustainable agriculture and productivity improvement through technological advancement. Also studies by Ashok Gulati have analyzed the impact of agricultural policies, subsidies, and market reforms on farmers' income.

Research Problem Statement

Agriculture in Maharashtra plays a crucial role in supporting the rural economy, yet farmers continue to face various challenges such as income instability, climate risks, and limited access to resources. Despite the implementation of various agricultural policies and schemes, there is a lack of clarity regarding their actual effectiveness at the ground level. For this it is essential to critically analyze the impact of these different type policies on farmers' livelihood and identify gaps in their implementation.

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Address for correspondence:
J. A. Shaikh,Assistant Professor, Department of Geography S.S.G.M College, Kopergaon, Dist. Ahmednagar (M.S.) India.

How to cite this article:
Shaikh, J. A. (2026). Agricultural Policies and their Impact on Farmers in Maharashtra. Bulletin of Nexus Journal, 3(3(II)), 59–64. https://doi.org/10.5281/zenodo.20839984

Quick Response Code:

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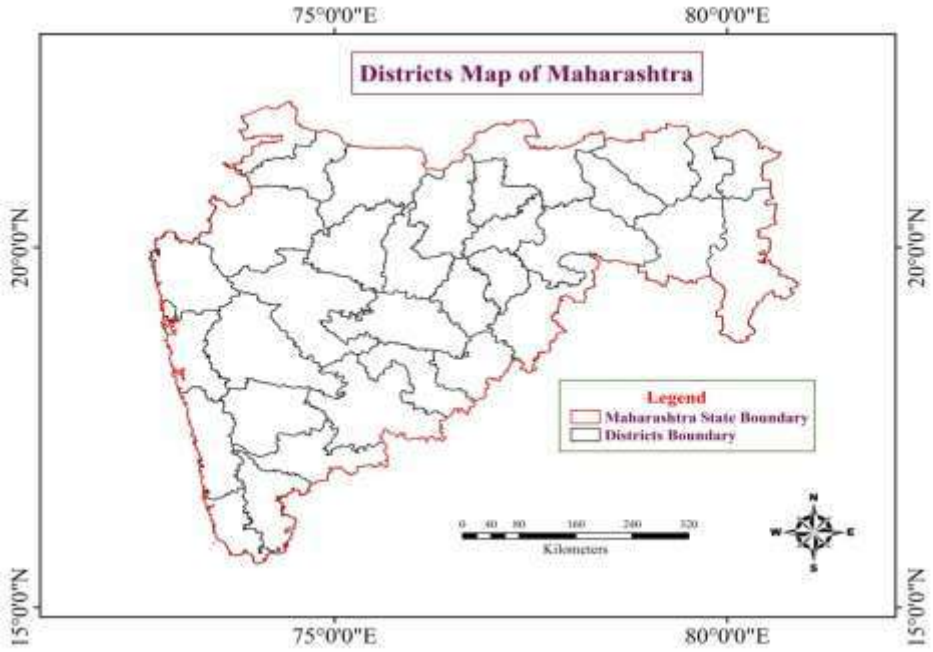
Study Area

The present study focuses on the state of Maharashtra, located in the western part of India. Maharashtra is the third-largest state in India by area and second-largest by population, making it an important region for Agriculture and geographical analysis. The state lies between 15°35′ N to 22°02′ N latitude and 72°36′ E to 80°54′ E longitude, covering an area of about 3,07,713 square kilometers.



Objectives

The main objectives of this research are:

1. To study major agricultural policies implemented between 2000 to 2025 in Maharashtra.
2. To analyze the impact of these various policies on farmers' income and livelihood.
3. To identify challenges in policy implementation.
4. To suggest measures for improving agricultural policy effectiveness

Research Methodology

This study is based on **secondary data** collected from:

- Government reports
- Research articles
- Agricultural news and policy documents

Methods Used:

- Descriptive analysis
- Comparative analysis

Major Agricultural Policies in Maharashtra

Agricultural policies in Maharashtra between 2000 and 2025 have shifted from focusing on basic production increases to leveraging technology, climate resilience, and enhancing farm income through digitalization like AI, and value-chain development. Key reforms included shifting towards micro-irrigation, supporting organic farming, and simplifying land-use.

Year	Policy / Initiative	Key Objectives & Impact	Source
2000–2005	National Agriculture Policy (2000)	Targeted 4% annual growth through structural and tax reforms.	*Agricultural Policy (NIC)*
2007–2012	National Policy for Farmers	Shifted focus from "production" to "farmer well-being" and income.	*National Agriculture Policy (PIB)*
2015-2016	Per Drop More Crop (PDMC)	Promote water efficiency via micro-irrigation. 95.58 lakh ha covered nationally; state-level focus on 56.33 lakh ha potential created.	*Press Information Bureau (PIB)*
2016–2020	PM Fasal Bima Yojana (PMFBY)	Insurance cover against crop loss from natural calamities. Provided a safety net with low premiums (2% for Kharif, 1.5% for Rabi).	*Press Information Bureau (PIB)*
2018–2023	Maharashtra	Boost agro-exports and global market access.	*Times of India*

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	Agriculture Export Policy	Agro-food exports reached ₹47,017 crore in FY 2024-25, showing 15% growth.	*(Nashik)*
2023-24	Namo Shetkari Mahasanman Nidhi	Direct cash transfer to support production costs 91.65 lakh farmers received ₹1,892.61 crore in the 7th installment (Sept 2025).	*Economic Times*
2024–2025	Solar Pump & Power Schemes	Installed 3.12 lakh pumps via "Maa Gele Tyala Solar Pump Yojana."	*Raj Bhavan Maharashtra*
2025–2029	Maha Agri-AI Policy	Integrate AI, drones, and IoT for precision farming. ₹500 crore allocated for first 3 years; establishment of Agro Data Exchange (A-DeX).	*Maha Agriculture Dept*

Results-

i). Policy-wise Summary (Maharashtra Agriculture)

Year	Policy / Scheme	Objective	Key Data	Impact
2000	National Agriculture Policy	4% growth target	Growth target 4%	Base for reforms
2007–12	National Policy for Farmers	Farmer welfare	Focus on income	Shift in policy approach
2015–16	Per Drop More Crop	Water efficiency	95.58 lakh ha (India)	Boost irrigation
2016–20	PM Fasal Bima Yojana	Crop insurance	2%–1.5% premium	Risk reduction
2018–23	Agri Export Policy	Increase exports	₹47,017 crore exports	Income growth
2023–24	Namo Shetkari Scheme	Direct income	91.65 lakh farmers	Financial support
2024–25	Solar Pump Scheme	Energy support	3.12 lakh pumps	Cost reduction
2025–29	Maha Agri-AI Policy	Smart farming	₹500 crore budget	Tech advancement

In the early phase, the National Agriculture Policy (2000) emphasized increasing agricultural growth to 4 percent per annum. This policy mainly focused on structural reforms and laid the foundation for modernization in agriculture sector.

During the period 2007–2012, the National Policy for Farmers marked a significant shift from only production to farmer-centric development. The focus moved towards improving farmers' income, sustainability, and risk reduction, indicating a broader understanding of agricultural development.

From 2015 onwards, policies such as Per Drop More Crop and PM Fasal Bima Yojana (2016–2020) addressed critical issues like water scarcity and risk management in agricultuesector.

In Agriculture Export Policy (2018–2023) reflects a shift towards market-oriented agriculture, aiming to increase farmers' income through export promotion. The significant of the export value indicates the growing importance of global markets.

Recent policies such as the Namo Shetkari Scheme (2023–24) and Solar Pump Scheme (2024–25) focus on direct income support and cost reduction, helping farmers manage rising input costs. Furthermore, the Maha Agri-AI Policy (2025–2029) highlights a transition towards technology-driven agriculture, including AI and digital tools.

ii). Financial Support & Income Data

Scheme	Beneficiaries	Financial Support	Impact
PM-KISAN + State Scheme	90+ lakh farmers	₹6000 + state support	Input cost support
Namo Shetkari	91.65 lakh	₹1,892.61 crore	Income stability
Crop Loan (Maharashtra)	Farmers	₹40,000+ crore	Credit availability

The PM-KISAN and State Support Schemes provide direct income assistance of ₹6000 per year along with additional state benefits to around 90 lakh farmers. This financial support helps farmers meet their basic agricultural expenses such as seeds, fertilizers, and labour costs. Although the amount is relatively small, but it plays an important role in reducing immediate financial stress, especially for small and marginal farmers.

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The Namo Shetkari Scheme further strengthens income support by providing substantial financial assistance to about 91.65 lakh farmers, with a total distribution of ₹1,892.61 crore. This scheme enhances income stability and complements central government initiatives, ensuring that farmers have better financial security.

Overall, data shows that financial support policies have significantly improved credit access, income stability, and input affordability for farmers.

iii). Irrigation & Water Management Data

Indicator	Data
Irrigation Potential Created	56.33 lakh hectares
Area under Micro Irrigation	Increasing trend
Solar Pumps Installed	3.12 lakh
Rainfed Agriculture	70–80%

The creation of 56.33 lakh hectares of irrigation potential indicates significant government efforts to expand irrigation infrastructure in maharastra. This has contributed to improving agricultural productivity and reducing dependence on uncertain rainfall in some regions. Whereas, the full utilization of this potential remains a challenge due to issues like uneven water distribution and infrastructural limitations.

The installation of 3.12 lakh solar pumps represents an important step toward sustainable agriculture in maharastra. These pumps reduce dependence on conventional electricity and diesel, lowering operational costs for farmers and promoting the use of renewable energy in irrigation system.

Despite these improvements, a major concern is that 70–80% of agriculture remains rainfed, this shows high dependence on monsoon rainfall. This makes agriculture highly vulnerable to climate variability and drought conditions, which can negatively impact crop production and farmer income also.

iv). Insurance & Risk Management Data

Indicator	Data
PMFBY Premium	2% (Kharif), 1.5% (Rabi)
Coverage	Large farmer base
Benefit	Protection from natural disasters
Issue	Claim delays

The low premium rates 2% for Kharif crops and 1.5% for Rabi crops make the scheme affordable and accessible to a large number of small and marginal farmers. This encourages wider participation and inclusion, especially among small and marginal farmers who are more vulnerable to crop losses.

This scheme covers a large farmer base, indicating its wide reach and acceptance across the state. It provides financial protection against natural disasters such as droughts, floods, and pest attacks, which are common risks in Maharashtra due to its climatic variability. As a result, farmers are able to reduce uncertainty and continue agricultural activities with greater confidence.

Overall, while crop insurance schemes like PMFBY play a important role in protecting farmers from various type of risks, improving claim settlement efficiency, transparency, and awareness is essential to enhance their effectiveness and ensure real benefits reach farmers.

v). Export Performance Data

Year	Export Value (₹ Crore)	Growth
2018–19	30,000+	Base
2020–21	40,000+	Increase
2024–25	47,017	15% growth

The present data shows the growth trend of agricultural exports from Maharashtra over the period from 2018–19 to 2024–25, indicating a positive contribution of agriculture to the state's economic development.

In the 2018–19, the export value was around ₹30,000 crore, which serves as the base level. During this period, agricultural exports were growing steadily but were limited by infrastructural and market challenges.

In 2024–25, exports reached ₹47,017 crore, reflecting a 15% growth, which indicates strong performance in the agricultural export sector. In Maharashtra High-value crops such as grapes, pomegranates, and onions have played a important role in boosting export earnings and improving farmers' income in certain regions.

Overall, the data shows that agricultural exports are a growing strength of Maharashtra's economy, contributing to income generation, also

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foreign exchange earnings, and agricultural modernization.

vi) . Technology & Innovation Data

Policy	Investment	Focus Area
Maha Agri-AI Policy	₹500 crore	AI, drones
Digital Agriculture	Increasing adoption	Smart farming
Precision Farming	Emerging trend	Yield improvement

The Maha Agri-AI Policy, with an investment of ₹500 crore, represents a major step toward digital transformation in agriculture of Maharashtra. The concentrate on artificial intelligence, drones, and data-driven systems aims to improve crop monitoring, pest detection, and decision-making. This policy shows the government's vision of making agriculture more efficient, precise, and sustainable.

Overall, the data shows that Maharashtra is moving toward smart agriculture, where innovation plays a key role in development. However, various challenges such as lack of awareness, high initial investment, and limited digital literacy among farmers may restrict widespread adoption. Therefore, training, infrastructure development, and government support are essential to fully realize the benefits of technological advancements in agriculture sector.

9. Discussion

Impact Analysis (Positive vs Negative)

Sector	Positive Impact	Negative Impact
Income	Direct benefit schemes	Limited amount
Irrigation	Micro-irrigation growth	Unequal access
Insurance	Risk protection	Delay in claims
Exports	Increased revenue	Price fluctuation
Technology	Modern farming	Awareness gap

Before vs After Policy Comparison

Indicator	Before Policies	After Policies
Irrigation	Low coverage	Increased micro-irrigation
Income	Unstable	Direct benefit schemes
Risk	High	Insurance available
Exports	Limited	Significant growth
Technology	Traditional	AI & digital farming

Impact on Farmers

The impact of these various policies is a mix of economic stabilization and ongoing structural challenges.

- **Economic Stability:** Large-scale implementation of schemes like PM-KISAN and e-NAM has been linked to a 45% increase in income stability and a 28% reduction in indebtedness among participating household's farmers.
- **Risk Mitigation:** present studies show a notable reduction in suicide occurrences in high-risk districts (e.g., Aurangabad, Nagpur) following more robust PMFBY implementation, though delays in claim payouts remain a major grievance for farmers.
- **Technological Shift:** The move toward AI and precision farming is transforming farmers from passive welfare recipients into "data-driven entrepreneurs," although 85% of smallholders still face barriers in accessing these types of expensive technologies.
- **Horticultural Leadership:** Maharashtra focused export policies have allowed Maharashtra to rank 1st in the production of grapes, pomegranate, and bananas, significantly boosting the income of fruit grower farmer.

Persistent Challenges

Despite robust policy plans, several gaps hinder the full realization of benefits for farmers:

- **Land Fragmentation:** The average size of operational holdings has shrunk from 1.58 ha to 1.18 ha, making it mechanization and economies of scale difficult.
- **Implementation Gaps:** Only about 17.9% of the net sown area in Maharashtra is irrigated, which is well below the national average, leaving most farmers dependent on unpredictable, inconsistent, irregular monsoons.
- **Budgetary Imbalance:** Recent analysis of this studies suggests a shift from long-term infrastructure development (like irrigation and storage system) toward short-term direct monetary relief, which may not address root causes of rural distress.

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Positive Impacts:

- Increased financial security through direct benefit transfers to the farmers.
- Risk reduction through crop insurance for farmers.
- Improved productivity of agriculture due to better irrigation and technology.
- Encouragement of crop diversification and horticulture.
- Growth of modern techniques such as drone- and AI based farming.

Negative Impacts:

- Delays in insurance claim settlements of farmers.
- Lack of awareness among farmers.
- Exclusion of eligible beneficiaries due to technical issues.
- Unequal distribution of benefits.
- Corruption and misuse in some schemes

Various agricultural policies in Maharashtra have significantly contributed to improving farmer welfare and agricultural productivity. Still, there is a clear gap between policy design and implementation. Whereas financial assistance and technological support are beneficial, inefficiencies in execution reduce their effectiveness.

Findings

1. Agricultural policies have improved farmer income and productivity
2. Crop insurance schemes are useful but suffer from delays
3. MSP provides price security but needs wider coverage
4. Implementation gaps reduce policy effectiveness
5. Awareness among farmers is still limited

Suggestions

- Ensure timely payment of insurance claims
- Improve transparency in scheme implementation

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Agricultural Policies and their Impact on Farmers in Maharashtra*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of agricultural policies, rural development, and the challenges faced by farmers in Maharashtra.

I would also like to acknowledge the contributions of researchers, policymakers, and agricultural experts whose work on farming practices, government schemes, and the rural economy provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Finally, I am deeply grateful to my family for their unwavering support, patience, and motivation, which made the successful completion of this project possible.

This accomplishment would not have been possible without the guidance and support of all these individuals.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

A Comparative study on Startup and Innovation expenses budget by Government of India

Mahale Santosh Abasaheb
(SSGM College Kopargaon, Dist: Ahilyanagar)

Manuscript ID:
BN-2026-030314

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 65-68

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840011
DOI link:
https://doi.org/10.5281/zenodo.20840011

Abstract

The Indian government has been setting aside funds every year for the Startup India Programme. The amount allocated for startups changes each year. This programme is definitely helping new business owners in a meaningful way. The Ministry of Information Technology (MeitY) has increased its budget by almost 40%, reaching ₹16,549 crore, which greatly benefits tech-based startups. The Startup India Seed Fund provides a grant of up to ₹20 lakh for developing proof of concept or prototypes. The SME Growth Fund has a dedicated allocation of ₹10,000 crore to create "Champion MSMEs," offering support through equity-style funding for scaling and technology use.

Keywords: *Budget, Startup, Innovation, SISFS, FFS, Mudra Loan, Digital Products, Online Service, Branding, Marketing, Tax Holiday, Carbon Capture, SME, MSME, AAF.*

Introduction:

Startups that are eligible can avoid paying income tax for three years in a row during their first ten years of being registered.

Angel Tax Exemption: Startups that are officially recognized don't have to pay the Angel Tax (Section 56(2)(viib)), which is a tax on capital raised at a price higher than the fair market value.

Intellectual Property Rights (IPR) Support: Startups get fast-track patent examination, which cuts down the time to get a patent, along with up to 80% discount on patent filing fees and 50% on trademark fees.

Financial Support & Funding: Access to the Startup India Seed Fund Scheme, a ₹10,000 crore Fund of Funds managed by SIDBI, and credit guarantee schemes are available.

Easier Compliance & Self-Certification: Startups can self-certify that they are complying with 6 labor laws and 3 environmental laws, which reduces inspections and paperwork.

Public Procurement Norms: Startups are exempt from proving their past turnover or experience before applying for government tenders, making it easier to get contracts.

Objectives:

1) To compare the funds made available for startups by the Indian government.
2) To understand the startup scheme.
3) To understand the benefits of the startup scheme for new entrepreneurs.
4) To understand the benefits to employment in the country.
5) To understand the trends in expenses from year to year.

Scope:

This is a comparison of startup funding amounts from 2023 to 2026. Only the funding provided specifically for startups is included.

Seed Fund Scheme (SISFS): Offers grants up to ₹20 lakh and debt/convertible debentures up to ₹50 lakh for early-stage startups working on prototypes and entering the market.

Fund of Funds (FFS): Gives money to Alternative Investment Funds (AIFs), which then invest in startups.

Credit Guarantee Scheme (CGSS): Helps startups get loans without needing collateral, up to ₹20 crore.

Atal Innovation Mission (AIM): Supports innovation by offering mentoring and other forms of help.

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Address for correspondence:
Mahale Santosh Abasaheb, (SSGM College Kopargaon, Dist: Ahilyanagar)
Email: smahale120@gmail.com

How to cite this article:
Mahale, S. A. (2026). A Comparative study on Startup and Innovation expenses budget by Government of India. Bulletin of Nexus Journal, 3(3(II)), 65–68. https://doi.org/10.5281/zenodo.20840011

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Limitations:

1) Only startup-related schemes are considered.
2) The research covers a period of 4 to 5 years.
3) Only a few schemes related to startups are included in the research.
4) Large business schemes are not included.
5) Only the budgeted figures are taken into account.

Research Methodology: Secondary data from existing reports and government publications was used.

Data:

In the Union Budget 2023-24, the Indian government introduced several financial allocations and policy changes to support the startup ecosystem.

Key Government Allocations (FY 2023-24):

- Startup India Programme: ₹30 crore was allocated.
- Startup India Seed Fund Scheme (SISFS): This programme, which started in 2021 with an overall budget of ₹945 crore, received ₹283.5 crore in the previous budget cycle for grants related to proof-of-concept and prototype development.
- Fund of Funds for Startups (FFS): The long-term fund of ₹10,000 crore remains unchanged to assist with early-stage venture capital.
- Ministry of IT (MeitY): The budget was increased by almost 40% to ₹16,549 crore, benefiting tech-based startups.
- Agriculture Accelerator Fund: This fund was created to support innovative solutions and agritech startups in rural areas.

Important Policy Changes for Startups:

- Tax Benefit Extension: The deadline for eligible startups to get a 100% tax holiday was moved from March 31, 2023, to March 31, 2024.
- Carry Forward of Losses: The time period for carrying forward losses when there is a change in ownership was extended from 7 years to 10 years.
- Mudra Loans: The limit for Mudra loans under the 'Tarun' category was increased to ₹20 lakh to encourage new entrepreneurs.
-Presumptive Taxation: The maximum turnover for small businesses to qualify for presumptive taxation was raised to ₹3 crore.

Market Context (2023):

Although the government provided significant support, 2023 was a challenging year for Indian startups.

The total amount of venture capital funding dropped to about $11 billion, down sharply from $25 billion in 2022.

Would you like a breakdown of how to apply for these specific startup grants or more details on the eligibility for tax exemptions?

For the period 2024-25, a startup's budget typically ranges from ₹10,000 for a home-based service to over ₹1 crore for a high-growth tech or storefront operation. The exact amount depends heavily on your industry and whether you are "bootstrapping" or seeking venture capital.

Typical Startup Budget Ranges (2024-25)

Online/Service-Based: ₹10,000 – ₹1,00,000.

These are often solo operations requiring only a laptop, domain, and basic marketing.

Digital Products/Tech (SaaS): ₹15,00,000 – ₹1,00,00,000.

Initial costs are driven by software development, which often averages ₹12.5 lakh to ₹37.5 lakh in the first year.

Small-Scale Manufacturing: ₹50,000 – ₹10,00,000.

Costs include machinery, raw materials, and basic factory compliance.

Retail/Storefront: ₹3,00,000 – ₹1,00,00,000+.

High overhead for rent, interior fit-outs, and significant initial inventory.

Core Budget Categories

One-Time Setup Costs:

Registration & Legal: ₹8,000 – ₹15,000 for private limited company formation.

Equipment: ₹1.5 lakh – ₹8 lakh for basic IT or manufacturing machinery.

Branding & Website: ₹5,000 – ₹50,000 for initial logo design and a functional site.

Monthly Recurring Expenses:

Salaries: Typically the largest cost, often making up 25–50% of the total budget.

Rent: Ranges from ₹30,000/month in standard areas to over ₹1.8 lakh/month in high-end commercial hubs like BKC.

Marketing: Median spend is roughly 8% of annual recurring revenue (ARR) for SaaS companies.

Government Financial Assistance (2024-25)

The Indian Union Budget has allocated specific funds that can reduce your direct capital needs:

Startup India Seed Fund: Provides up to ₹20 lakh as a grant for proof of concept or prototype development.

Innovation Fund: A ₹1 lakh crore corpus provides 50-year interest-free loans for research and innovation in private sectors.

Credit Guarantee: Startups can access collateral-free loans with guarantee covers up to ₹20 crore (doubled from ₹10 crore in recent updates).

Pro Tip: Budget for at least 6-12 months of operating expenses (burn rate) before you expect consistent revenue to avoid cash flow failure.

Would you like a more detailed breakdown for a specific industry, or do you need help finding government grant application portals?

In the Union Budget 2025-26, the Indian government announced several significant financial allocations and policy shifts to support the startup and MSME ecosystem.

Core Funding Allocations

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Fund of Funds for Startups (FFS): A new ₹10,000 crore Fund of Funds was established to supplement the existing ₹10,000 crore corpus.

This aims to boost venture capital for early-stage and high-growth startups.

Research & Development (R&D): ₹20,000 crore was allocated to implement a private sector-driven research, development, and innovation initiative.

Deep Tech Fund: The government is exploring a dedicated Deep Tech Fund of Funds to specifically support long-term capital needs for AI, quantum computing, and advanced robotics.

Credit & Loan Enhancements

Doubled Credit Guarantee: The credit guarantee cover for startups was increased from ₹10 crore to ₹20 crore.

Additionally, the guarantee fee was reduced to 1% for loans in 27 priority sectors.

Micro-Enterprise Credit Cards: New customized credit cards with a ₹5 lakh limit will be issued to 10 lakh micro-enterprises in the first year to improve working capital access.

First-Time Entrepreneurs: A scheme for 5 lakh first-time women, SC, and ST entrepreneurs will provide term loans of up to ₹2 crore over the next five years.

Tax Incentives & Regulatory Ease

Tax Holiday Extension: The eligibility for startups to claim 100% tax exemption on profits for three consecutive years (under Section 80-IAC) was extended for five years, covering startups incorporated before April 1, 2030.

Revised MSME Classification: To help businesses scale without losing benefits, investment limits were increased by 2.5 times and turnover limits were doubled.

Micro: Up to ₹2.5 crore investment / ₹10 crore turnover.

Small: Up to ₹25 crore investment / ₹100 crore turnover.

Medium: Up to ₹125 crore investment / ₹500 crore turnover.

Are you looking for a specific type of startup funding, such as seed grants for proof-of-concept or larger venture capital support?

The Union Budget 2026-27 in India has allocated several dedicated funds and outlays to support startups and MSMEs, focusing on high-growth potential and strategic sectors like deep tech, biopharma, and semiconductors.

Key Startup & MSME Funding Allocations

Fund of Funds for Startups (FFS): A fresh infusion of ₹10,000 crore to catalyze early- and growth-stage startups through SEBI-registered venture capital and alternative investment funds.

SME Growth Fund: A dedicated ₹10,000 crore outlay to create "Champion MSMEs," providing equity-style support for scaling and technology adoption.

Self-Reliant India (SRI) Fund: An additional ₹2,000 crore top-up to continue providing risk capital specifically for micro-enterprises and scaling startups.

Deep Tech Fund of Funds: A new initiative focusing on capital-intensive sectors such as AI, quantum computing, and space tech.

Sector-Specific Budget Outlays

Electronics & Semiconductors: The Electronics Component Manufacturing Scheme (ECMS) outlay has been increased to ₹40,000 crore to support domestic hardware startups.

Biopharma SHAKTI: A ₹10,000 crore programme over five years to build a domestic ecosystem for biologics and biosimilars.

Container Manufacturing: A ₹10,000 crore scheme over five years to develop a globally competitive domestic shipping container industry.

Carbon Capture (CCUS): A massive outlay of ₹20,000 crore over five years for clean-tech and sustainability startups.

Regulatory & Support Measures

TReDS Mandate: All Central Public Sector Enterprises (CPSEs) must now use the TReDS platform for MSME purchases, significantly improving cash flow for B2B startups.

Safe Harbour Threshold: Raised from ₹300 crore to ₹2,000 crore for IT services, providing greater tax certainty for large-scale tech companies.

Courier Exports: Removal of the ₹10 lakh value cap per consignment to boost e-commerce exports for small businesses and startups.

Would you like to know the eligibility criteria for any of these specific funds, or do you need help finding the official application portals?

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *A Comparative Study on Startup and Innovation Expenses Budget by Government of India*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of government budgeting, startup initiatives, and innovation policies in India.

I would also like to acknowledge the contributions of researchers, policymakers, and scholars whose work on public finance, entrepreneurship, and innovation ecosystems provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and

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constructive feedback during the preparation of this work.
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Financial support and sponsorship
Nil.

Conflicts of interest
The authors declare that there are no conflicts of interest regarding the publication of this paper

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9) https://www.pib.gov.in
10) https://m.economictimes.com

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Tourism And Rural Development: Study of Bhansahivara Fort, Tal. Newasa, Dist. Ahmednagar (Maharashtra)

Rahul G. Nipunge[1]Dr. Kishor G. Dhanwate[2]
[1]Research Student,K.J. Somaiya Arts, Commerce and Science College Kopargaon
[2]Research Guide, K.J. Somaiya Arts, Commerce and Science College Kopargaon

Manuscript ID:
BN-2026-030315

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 69-72

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840039
DOI link:
https://doi.org/10.5281/zenodo.20840039

Abstract

Sustainable employment chances can lead to endless development of any sector. According to the 2011 census, 68.84% of people in India live in rural areas. After analysis the sustainable development perception and the changes in the modern environment, authors have noticed that the most fascinating destinations for modern tourists are rural tourism centers with untouched nature and specific cultural integrity. Based on these figures and facts, the basic assumption of the paper is that tourism can play an important role in steadying and helping rural destinations and promoting rural development. Sustainable employment should be created wherever rural areas are to be developed. Tourism is one of the world's fastest-growing sectors. After the development of the tourist area, which is unfamiliar to the tourists, the surrounding area is automatically developed. People in rural areas mainly depend on agriculture. But the income from agriculture is unstable. Because of this, this factor does not develop. In such places, sustainable employment should be achieved. Tourism development improves the quality of life of local people. Rural development can be boosted.

Bhanshivara Fort is a small village in Nevasa Tehsil. There are many small villages around the village. The fort is a fine example of Nizam period architecture. Due to some reasons this Fort is unknown to tourists. Therefore, this historical tourist spot has not been developed. If this Fort is known to people then this area will develop, people here will get new employment opportunities. Many industries based on tourism will develop. Therefore, the people of Bhansahivara and surrounding villages will get a livelihood opportunity. People will have sustainable employment opportunities based on tourism apart from agriculture and dairying. As a result, the development of the rural areas here will be possible.

***Keyword**: Sustainable employment, endless development, Tourism development, Bhanshivara Fort.*

Introduction:

Urban areas are developing all over the world. Still, the population living in rural areas is more in the world. In India, 74.45 % of the population lived in rural areas in 1990, 72.33 % in 2000 and 68.84 % in 2011. Rural development is essential for achieving national development through economic planning. And therefore, one has to try hard to understand the nature of rural problems and solve them. A developing country like India is in dire need of rural development.

What is rural development?

Rural development is an 'action plan' designed for the economic and social upliftment of rural areas. Rural development means raising the standard of living of people in rural areas.

Importance of Rural Development:

1. Rural development is not only related to agriculture and agribusiness but also contributes to the overall development of the country. It leads to overall national development.
2. Higher agricultural income increases the demand for industrial raw materials and creates more employment opportunities.
3. Better education increases productivity and skills.
4. Good health increases the rate of work of people and also increases the national income.

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Address for correspondence:
Rahul G. Nipunge, Research Student,K.J. Somaiya Arts, Commerce and Science College Kopargaon
Email: rhulnipunge@gmail.com

How to cite this article:

Nipunge, R. G., & Dhanwate, K. G. (2026). Tourism And Rural Development: Study of Bhansahivara Fort, Tal. Newasa, Dist. Ahmednagar (Maharashtra). Bulletin of Nexus Journal, 3(3(II)), 69–72. https://doi.org/10.5281/zenodo.20840039

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5. Increase in agricultural process, small scale industries and overall rural development. Migration to the city stops.
6. It also helps in reducing poverty.

The basic human instinct to spend happy moments in the company of nature and learn about new art, culture is the basic basis of tourism. Religious and historical tourism is equally important. Today, as the world has become closer with the means of fast communication, this field is constantly expanding with the urge of man to know the country as well as the outside world. The role of tourism in the economy of any country is important. That is why the United Nations World Tourism Organization has set the slogan for this year's World Tourism Day as 'Sustainable Tourism-Instrument for Development' to make this role more important while looking to the future. The World Tourism Organization provides guidance on various aspects of tourism promotion and works for tourism development. There are 155 members of this organization including India.

Tourism is the third largest business in the world after chemicals and fuels. The sector has contributed greatly as a means of prosperity and hope of life for many citizens around the world. The living of many depends on the direct and indirect employment generated through the tourism sector. Businesses like transport, hotels, performing etc. have also been linked with tourism. Last year, 120 crore tourists visited various places around the world. Last year, 120 crore tourists visited various places around the world. The World Tourism Association has predicted that this number will reach 180 crores by 2030. It is possible to use this opportunity to promote sustainable development. Tourism must be measured in this regard. Along with social, economic and environmental development, the tourism corporate also changes the quality of life of the citizens active in the tourist area. Along with accommodation, food, transportation, information, entertainment, etc. required by the tourist, demand also rises for the products of that area. The work of connecting citizens with each other through cultural exchange is also done through tourism. Therefore, the more the participation of peoples in tourism development, the more the economy of that area gets a increase.

If Bhanshivara *Gadhi* is developed as a historical tourist spot, the rural areas surrounding it can be developed. In this article, we are going to discuss about the non-development of Bhanshivara *Gadhi*, the historical tourist area, some measures to develop this tourist area and how the surrounding countryside will be developed after the sale of this tourist area.

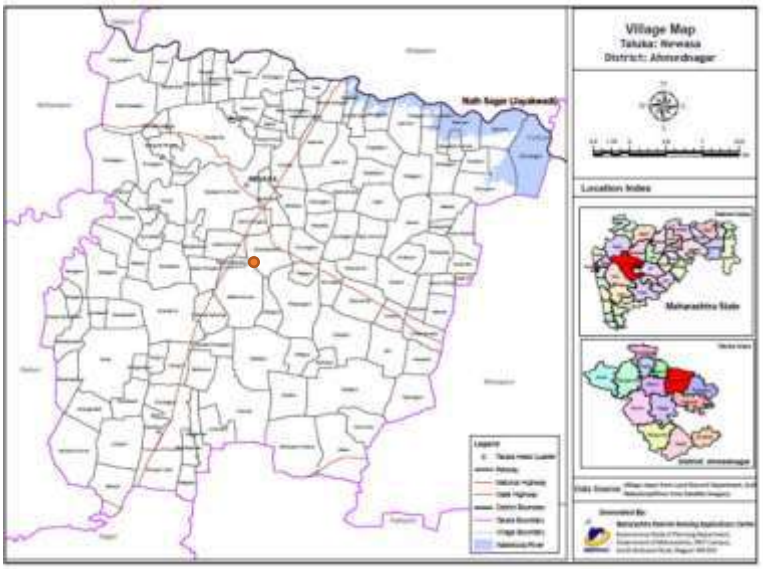
Objective: The development of Bhanshivara *Gadhi* tourist destination, can lead to rural development.

Study Area:- Bhansahivara village located in Newasa Tehsil, Ahmednagar district, state Maharashtra. The extent is 19^0 29′ 9″ North latitude and $74^0$57′59″ East Longitude. Total area of this village is 1.08 km^2. Population of the village is 12,443 (According to 2011 census).

The great Nizam's commandant "Kavijung" established the Bhanshivara village in the work-period of Nizam Shahi dynasty at around 1350 AD.

Historic Locations

One famous residence of the Emperor Kavijung was named as "*Gadhi*" and is situated in the heart of village. On behalf of Commandant Kavijung, there is one 'Janab Kavijng Sahab Dargah Sharif' also present in the village and on behalf of that, there is always a village-fair in every year.



Location Map of Study Area

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Photographs of Bhanshivara Gadhi

Surrounding villages:

Sr. No	Name of Village	Distance from Bhansahivara (km)	Population
1	Bhansahivara	0	12,443
2	Handinimgaon	2.5	2542
3	Mukindpur	2.7	5647
4	Khunegaon	2.3	1101
5	Nagapur	4.7	762
6	Saundala	7.5	1882
7	Bhenda Kh	11.3	2792
8	Ranjangaon	3.9	3143
9	Malichinchora	5.1	5175
10	Sureshnagar	2.4	658
Total			**36055**

Source: census of India, 2011

Surrounding Tourist Centers:

Sr. No.	Name of Tourist Center	Distance from Bhansahivara (km)	Type
1	Trivenishwar	2.5	Religious
2	Shri Dnyaneshwar Temple	7.4	Religious
3	Devgad	14.2	Religious
4	Shnishingnapur	20.6	Religious

Need or effect of the development of Bhanshivara *Gadhi* tourist destination

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The total population of Bhansahivara and surrounding villages is 36055. About 70% of i.e. 25238 people are dependent on agriculture and agro-based business. The number of educated unemployed youth is high in the area. If the study area is developed, at least 20%, i.e. 5100 people will get sustainable employment.

Measures to develop the Bhanshivara historical tourist center

1. Promotion of Bhanshivara *Gadhi* in nearby tourist destinations.
2. Allowing the people living in the *Gadhi* to let other tourists in.
3. To provide transport and other essential services at this place by the local government body.
4. Inclusion of Bhanshivara *Gadhi* in National Historic Tourist Site by Govt.
5. Creating a transport system connecting the surrounding tourist spots.
6. Employing workers to maintain the *Gadhi*.

Conclusion:

Sustainable rural development provides permanent economic employment to people. It increases their social standard of living. Essential and basic needs of people are fulfilled. Due to economic prosperity, people do not turn to crime, thus reducing crime, resulting in social peace and order. Reduces burden and cost on the government system. That money can be spent on other basic elements of society instead.

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Bulletin of Nexus

Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal

ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

A Study on Future Trends Forecasts for E-Commerce

Zoje Neha Siddharth

SSGM College, Kopergaon

Manuscript ID:
BN-2026-030316

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 73-79

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840069
DOI link:
https://doi.org/10.5281/zenodo.20840069

Abstract

The quick changes in technology have created a constantly evolving landscape for the e-commerce industry, leading to ongoing changes in how consumers behave, how businesses operate, and how new technologies are developed. This review study looks at the present condition of e-commerce and evaluates the trends and predictions that are expected to shape its future. Through a thorough analysis of academic papers, industry reports, and expert opinions, this paper identifies key factors that are influencing the e-commerce environment, such as the growth of mobile commerce, the expansion of omnichannel retailing, and progress in artificial intelligence. It also highlights the increasing importance of sustainability in consumer decision-making. The report provides an in-depth look at how emerging technologies like augmented reality (AR) and virtual reality (VR) can enhance the online shopping experience. It also explores the evolving needs of customers, the role of personalization, and the significance of using data to help businesses remain competitive in the online marketplace. The study also considers the opportunities and challenges arising from cybersecurity issues, regulatory requirements, and the global expansion of e-commerce. This article presents a comprehensive overview of future trends that are likely to impact the e-commerce industry as it continues to grow, based on information from a variety of sources. The study adds value by closely examining recent developments and making informed predictions about what may occur next. It offers useful insights for researchers, industry professionals, and policymakers who are seeking to understand and manage the fast-paced world of online shopping. To assist businesses in adapting and thriving in this changing environment, the study provides practical recommendations.

Keywords: *Omnichannel retailing, e-commerce, trends, predictions, technology, consumer behaviour, business strategies, artificial intelligence, mobile commerce, sustainability, augmented reality, virtual reality.*

Introduction

As global commerce continues to evolve, the rise of electronic commerce (e-commerce) has become a defining feature. It has undeniably revolutionized how businesses function and how consumers conduct transactions. As technological advancements continue to reshape our world, the e-commerce sector stands at the forefront of this transformation. At the forefront of innovation, we constantly push the boundaries of what is possible. This research paper. Titled "The Future of E-Commerce: Trends and Predictions," this piece explores the dynamic world of e-commerce to uncover anticipated trends and forecast its future trajectory. The marketplace is set to expand significantly in the coming years. The rapid expansion of internet connectivity, combined with the widespread adoption of smartphones, has. Digital payment systems have catalysed the growth of e-commerce, making it an integral part of the modern economy. The global economic ecosystem. This paper aims to offer a comprehensive analysis of the key trends. They have shaped the current e-commerce landscape and, more importantly, aim to predict the future. Trajectories that will define the industry, regulatory environments, and world events. This study article attempts to offer a thorough and forward-looking view on the future of e-commerce by synthesizing current literature, evaluating empirical data, and utilizing expert perspectives. Businesses must comprehend new trends and foresee future changes in order to adapt and prosper in the digital world.

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Address for correspondence:
Zoje Neha Siddharth, SSGM College, Kopergaon
Email: dalvineha2001@gmail.com

How to cite this article:

Zoje, N. S. (2026). A Study on Future Trends Forecasts for E-Commerce. Bulletin of Nexus Journal, 3(3(II)), 73–79. https://doi.org/10.5281/zenodo.20840069

Quick Response Code:

Website: https://bnir.us

This document by bringing together existing research, examining real-world data, and using input from experts, this research paper aims to offer a thorough and insightful view of the future of e-commerce. As companies work to stay competitive in the digital world, it's important to understand new trends and predict how things might develop. This paper is a useful tool for those looking to gain a deeper understanding. Academics, industry experts, and policymakers all benefit from these strategic insights, helping them move forward in the constantly changing world of e-commerce. The study's background is rooted in the significant changes that have taken place in global trade due to the rise of electronic commerce, or e-commerce. As technology keeps advancing, it's important to look at where e-commerce might be heading and what new developments are likely to occur. The fast-changing nature of technology and how consumers behave play a big role in shaping the future of online shopping. This research is designed to look closely at new trends and make educated guesses about where e-commerce is headed in the near future-commerce involves buying and selling products and services through the internet, and it has become a key part of today's business world. In recent years, it has grown rapidly because of better internet access, improvements in mobile technology, and changes in how people shop. The ongoing shift towards digital solutions has led to new ways of doing business, a wide variety of online marketplaces, and fresh experiences for customers, making e-commerce a vital part of modern trade. But the e-commerce world is never the same for long. It changes quickly, driven by fast-moving technology and shifting customer needs. This research aims to take a close look at what's driving the future of e-commerce and explore the technological, economic, and social factors that will sha This study will explore how new technologies like artificial intelligence, virtual reality, and blockchain are influencing the e-commerce world. It will also look at how changing consumer habits, choices, and what people expect from online shopping are shaping the future of digital retail. With more focus on sustainability and environmental issues, the research will also examine how e-commerce can support eco-friendly practices. The results of this research are expected to offer useful information for businesses, government officials, and scholars. By understanding the future trends and developments in e-commerce, those involved can make smarter choices to stay competitive and take advantage of new chances. As the digital world keeps changing the way we do business globally, this study aims to provide a relevant and helpful overview of the ongoing changes in e-commerce.pe the industry going forward.

Justification

The rapid expansion of e-commerce has become a key feature of the digital era, influencing how businesses function and how consumers interact with products and services.

The research paper titled "THE FUTURE OF E-COMMERCE: TRENDS AND PREDICTIONS" offers a detailed look at the new trends and future outlook in the e-commerce world. This justification is meant to explain why it’s important to review this research paper, highlighting its role in understanding where e-commerce is heading.

1. Relevance and Timeliness: The e-commerce industry is constantly changing and developing new ideas, which means it's important for researchers, companies, and government officials to stay up to date with the latest trends. This paper covers the current situation in e-commerce and gives useful information about what’s expected in the future. Therefore, the review is a helpful tool for those looking to adjust and plan in a quickly changing digital market.
2. Comprehensive Exploration of Trends: The research paper not only looks at existing trends in e-commerce but also offers a forward-looking view by predicting what might happen next. By reviewing this paper, readers get a full picture of different aspects of e-commerce, such as technological improvements, changes in how people shop, and the effects of global events. This detailed coverage increases the paper’s usefulness as a trusted resource for making informed decisions.
3. In-Depth Analysis: The paper uses solid research methods to study data, offering a detailed review of the trends and predictions it identifies. The use of real evidence strengthens the paper’s reliability and makes it a valuable source for planning and decision-making. Case studies help make the findings more credible. A detailed review of the research paper allows readers to see how deeply the authors analysed the topic, making it a useful resource for both academics and professionals in the industry. Understanding future trends and predictions in e-commerce is essential for businesses trying to remain competitive.

   This research paper not only provides theoretical insights but also includes practical advice for different stakeholders. By reviewing this paper, readers can gain useful insights that help in making informed decisions, making it a valuable tool for professionals in the field.

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4. The research paper titled "The Future of E-Commerce: Trends and Predictions" is a significant contribution to understanding the e-commerce environment. Its relevance, timeliness, thorough examination of trends, detailed analysis, and practical insights make it an important subject for review. Academics, industry professionals, and policymakers will find this paper to be a helpful resource for dealing with the changing aspects of the e-commerce sector.

Objectives of the Study

1. To look into what's currently happening in the e-commerce world, including major changes, new technologies, and how people are shopping online, to give a full picture.
2. To find out how new technologies like artificial intelligence, augmented reality, and blockchain could affect the future of e-commerce and change the way the industry works.
3. To look at the difficulties and chances e-commerce companies face, such as security issues, delivery problems, and rules and regulations, and how these might affect where the industry is heading.
4. To guess what customers will want in the future, taking into account changing groups of people, cultural trends, and societal changes that could influence what people buy online.
5. To study how being green and acting responsibly can play a big part in the future of e-commerce, and how these values might be necessary for businesses to stay successful and last long.

E-commerce has become a major force in the global business environment, changing how consumers and companies interact. As technology continues to advance, the e-commerce industry is expected to see big changes in the near future. This review of existing research looks at what has been studied and predicted about the future of e-commerce, highlighting the trends and developments that are likely to happen.

Literature Review

1. Evolution of E-Commerce (2000-2010): The early part of the 21st century saw fast growth in e-commerce, with companies like Amazon and eBay leading the way. During this time, researchers looked into the main reasons people started using e-commerce and the difficulties businesses faced when moving to online platforms (Turban et al., 2002; Laudon & Traver, 2008). They also emphasized the importance of secure online payments and building trust as key factors that shape consumer choices (McKnight et al., 2002).
2. Mobile Commerce and Social Media Integration (2010-2015): The rise of smartphones and mobile commerce (m-commerce) brought about a major change in the e-commerce world. Researchers examined how mobile platforms affected consumer behaviour and the challenges businesses faced in adapting to this new trend (Dholakia et al., 2010; Smith et al., 2012). Also, the use of social media in e-commerce became a big topic, with studies looking at how it influences consumer decisions and brand interaction (Hoffman & Fodor, 2010; Hali, 2013).
3. Artificial Intelligence and Personalization (2015-2020): In the last decade, artificial intelligence (AI) has been added to e-commerce systems, helping to create personalized shopping experiences and improve customer service. Studies during this period focused on how AI affects customer satisfaction, supply chain efficiency, and predictive analysis (Bapna et al., 2018; Wang et al., 2019). The role of chatbots and virtual assistants in boosting user interaction and making the buying process smoother was also widely discussed (Xu et al., 2017).
4. Augmented Reality and Virtual Reality in E-Commerce (2020-2022): In recent years, there has been increasing interest in using augmented reality (AR) and virtual reality (VR) in e-commerce. Various studies have looked into how these immersive technologies can improve the online shopping experience by allowing customers to see products in a more realistic way before buying them (Cheng et al., 2021; Koo et al., 2022). The use of AR and VR is expected to change how customers interact with online stores, affecting their buying choices and how loyal they are to certain brands.
5. Sustainable E-Commerce (2022 and beyond): With growing concerns about the environment and sustainability, the future of e-commerce is likely to focus more on eco-friendly practices. Research in this area is expected to look into ways to make supply chains more sustainable, use environmentally friendly packaging, and develop carbon-neutral delivery methods. The role of customers in pushing for sustainable products and how eco-conscious practices affect brand reputation will also be important topics to study. This literature review gives a timeline of research on the development of e-commerce, from its beginning to the trends that are expected in the future. As we move forward, the use of new technologies like AR, VR, and AI, along with a strong emphasis on

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sustainability, is expected to shape the future of e-commerce, creating both new opportunities and challenges for businesses and researchers.

Material and Methodology

This review research paper aims to explore the emerging trends and make predictions about the future of e-commerce.

The study uses a detailed analysis of existing literature, combining insights from different sources to give a complete picture of how the industry is changing. The research design, methods for collecting data, criteria for including and excluding information, and ethical considerations are clearly outlined to make sure the findings are reliable and trustworthy.

Research Design:

The research uses a systematic review approach to collect and analyse information about future trends and predictions in e-commerce. This method involves a careful and organized look at existing literature, including academic articles, industry reports, and expert opinions. The systematic review helps bring together a wide range of views and insights, offering a deeper understanding of the topic.

Data Collection Methods:

a. Literature Review: -

1 Academic database such as PubMed, IEEE Xplore, and ScienceDirect will be searched thoroughly for relevant articles.

2 Industry reports, white papers, and conference proceedings will be considered to understand the real-world impact of new trends.

3 Expert interviews and opinions from leaders in the e-commerce field will be included to provide practical insights.

document Analysis: E-commerce platforms, technological developments, and market reports will be studied to gather data on current trends and predictions.

A comparison of case studies will be done to identify the factors that contribute to the success or challenges faced by e-commerce businesses.

Inclusion and Exclusion Criteria:

a. Inclusion Criteria:

Publications from the past five years to include the most recent trends.

- Articles that focus on new technologies, consumer behaviour, and market changes in the e-commerce sector.

- Studies that provide predictions and insights about the future of e-commerce.

b. Exclusion Criteria:

- Publications that are not relevant to the research goals.

- Outdated or repeated information.

- Non-peer-reviewed sources that lack credibility.

4.. Confidentiality:

• All data and information gathered during the research will be kept confidential to respect the intellectual property rights of the authors and organizations involved.

b. Plagiarism:

• We will take strict steps to make sure the review paper has no instances of plagiarism.

All sources used will be properly cited and referenced.

c. Objectivity:

• The review process will be carried out without any bias, ensuring a fair and balanced analysis of current e-commerce trends and future predictions.

By following these research design, data collection, inclusion and exclusion criteria, and ethical guidelines, this review paper aims to provide meaningful insights into the future of e-commerce, helping businesses, researchers, and policymakers make informed decisions. Cal Consideration:

Results and Discussion The study on future trends and predictions in the field of e-commerce has provided several important insights that help us understand where this fast-changing industry might be heading.

1.Growth of Mobile Commerce (M-Commerce): One major trend found is the growing importance of mobile shopping. Smartphones are becoming more common, and it's easier than ever to make purchases on mobile devices. As these devices become more advanced, with features like augmented reality (AR) and virtual reality (VR), the shopping experience on phones is expected to become more engaging and change how people buy things.

2.Use of Artificial Intelligence (AI) and Machine Learning (ML): The use of AI and ML technologies is a big factor in how e-commerce will develop. These smart systems are making shopping experiences more personalized, offering better product recommendations and helpful data analysis. As AI gets better, it will play a bigger role in managing stock, preventing fraud, and improving customer support, making businesses more efficient overall.

3.Better User Experience with AR and VR: AR and VR are set to change the e-commerce scene by giving customers more immersive and interactive experiences. For example, virtual try-ons for clothes and accessories, or AR features that let people see how products look in real life, can make online shopping feel more like a physical store. This is likely to increase customer interest and satisfaction.

4.Rise of Voice Commerce: Voice-activated devices and digital assistants are becoming more popular, leading to the growth of voice-based shopping. More people are using voice commands to search

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for products, place orders, and get tailored suggestions. The convenience of hands-free shopping is expected to drive further adoption, changing how people use e-commerce platforms.

5.Focus on Sustainable and Ethical Practices: The review also shows an increasing emphasis on sustainability and ethical behaviour in e-commerce. Customers are more aware of the environmental and social effects of their purchases. E-commerce businesses are responding by adopting eco-friendly practices, making supply chains more transparent, and offering greener choices. This marks a shift towards more responsible and conscious shopping.

6.Expansion of Global E-Commerce: E-commerce is no longer limited to local markets. Cross-border shopping is growing quickly because of easier international shipping, secure payment systems, and fewer trade barriers. This trend is expected to continue, bringing new opportunities and challenges for businesses entering different global markets.

Discussion:

The findings show how new technologies and changing customer habits are transforming the e-commerce world. As companies adapt to these trends, they should focus on using advanced technologies, prioritizing sustainability, and understanding the evolving global market. Moreover, the balance between privacy concerns and data security is a key issue that requires ongoing attention. Finding a way to use advanced technologies for personalization while still protecting user privacy is a challenge that businesses must constantly work on. The future of e-commerce looks promising, with new technologies, better user experiences, and a stronger focus on ethical practices. Companies that take these trends seriously and adjust to what customers want are more likely to succeed in the fast-changing digital marketplace.

Limitations of the study

1.Generalization Challenges: The study is based on existing research and predictions, so the results may not apply the same way everywhere. E-commerce can change a lot depending on where you are, the local economy, cultural factors, and how good the technology is in that area.

2.Time Sensitivity: Technology changes very quickly, and the e-commerce world is always shifting. This means some of the predictions may become outdated or wrong over time. The study gives a snapshot of the trends at a particular moment, but the fast pace of the industry makes some insights less relevant as time passes.

3.Data Reliance: The study uses data from various sources, and if that data is not accurate or has biases, it could affect the predictions. The reliability of the predictions depends on how correct and complete the data is.

4.Technological Advancements: New and unexpected technological developments could change the future of e-commerce in ways the study didn't predict. Some breakthroughs may not have been considered, which could influence the trends the study talks about.

5.Economic and Regulatory Changes: Economic shifts and changes in laws are hard to predict, but they can have a big effect on e-commerce. The study may not fully account for how unexpected events like economic downturns, policy changes, or global issues could impact the future of online shopping.

6.Consumer Behaviour Variability: People's buying habits are hard to predict. The study might not cover all the factors that affect why people make purchases. Shifts in what people value, their preferences, or cultural trends that weren't considered could impact the accuracy of the predictions.

7.Industry-Specific Dynamics: E-commerce covers many different areas, each with its own unique features. The study might not go deep enough into the specifics of certain industries, possibly missing trends that are unique to particular sectors.

8.Environmental Factors: The study might not cover environmental issues like climate change, sustainability efforts, or political events, which could have a big impact on how e-commerce develops in the future.

9.Limited Primary Research: The paper mainly uses secondary sources and reviews of existing work, which limits how much original insight it provides. Doing new research through interviews or surveys could give a clearer picture of what people think and expect from the industry.

10.Ethical and Security Concerns: The study doesn't go into much detail about potential ethical problems or security risks related to future trends in e-commerce. Issues such as data privacy, online security threats, and the ethical use of new technologies might need more attention beyond what is covered in this paper.

Future Scope

The research paper titled "The Future of E-Commerce: Trends and Predictions" provides a comprehensive analysis of the current state of e-commerce and outlines emerging trends and predictions for the future. This future scope aims to guide further research in the dynamic field of e-commerce, paving the way for a deeper understanding of evolving consumer behaviour, technological advancements, and industry dynamics.

1.Advanced Technologies Integration: The integration of emerging technologies such as

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artificial intelligence, virtual reality, and augmented reality in e-commerce is a rapidly evolving landscape. Future research should delve into the implications of these technologies on user experience, personalization, and overall business efficiency. Investigating how these technologies can be Seamless integration into e-commerce platforms will be key to staying competitive in the current market.

Blockchain and cryptocurrency are gaining popularity: so it's important to look into how they can help secure transactions, increase transparency, and reduce fraud in e-commerce.

It's also important to understand how businesses are adopting cryptocurrency payments and the challenges they face, as this will shape the future of online financial transactions.

As people become more aware of environmental issues: e-commerce needs to explore ways to become more sustainable. Future studies should look into methods for lowering the carbon footprint of e-commerce, eco-friendly packaging options, and how consumers feel about buying products that are environmentally friendly.

The global spread of e-commerce: brings both challenges and chances for businesses operating internationally. Research should focus on understanding the rules and regulations, the difficulties in logistics, and what customers prefer when shopping across borders. Finding effective ways for businesses to handle these international operations will be essential.

Consumer behaviour online is always changing: so, it's important to study the factors that influence how people make buying decisions on e-commerce sites. This includes the role of social media, content created by customers, and the influence of online personalities. Understanding these factors will help businesses adjust their strategies to match what customers want.

With more cyber threats being reported: it's crucial to research the latest security tools and privacy protections for e-commerce sites. Looking at how data breaches affect customer trust and finding new ways to protect online transactions will be necessary for the continued growth of e-commerce.

The paper mentions changing business: models like subscription services and direct-to-consumer approaches. Future studies should examine how well these models can scale, how flexible they are, and their long-term success, considering their effects on customer loyalty, income sources, and market competition.

The future directions mentioned: provide a guide for researchers and industry experts to explore various areas that are shaping the online business world. Keeping up with these topics will lead to a better understanding of the challenges and opportunities in e-commerce, encouraging innovation and smart planning in this fast-moving industry.

Conclusion

The look at current trends and what's ahead in the e-commerce world shows a fast-changing and growing future for online business. Quick tech advances, changes in how people shop, and the big shift toward the digital world have created new chances and challenges for e-commerce. Mobile shopping is growing, and using AI is becoming more common, while businesses are focusing more on making personalized experiences for customers.

The future of e-commerce is likely to have easy-to-use and smart interfaces, with tools that predict what customers want, and a wider range of products and services available online.

The paper also looked at how important sustainability and ethical practices are in e-commerce, showing that more customers want eco-friendly and socially responsible ways of doing business. As people become more aware of their choices, companies will probably focus on green practices to stay relevant and build customer trust. Looking ahead, data security and privacy are key. With more online threats, e-commerce platforms need strong security to protect customer information and keep online shopping safe. In conclusion, the future of e-commerce depends on innovation, the ability to adapt, and keeping up with changing customer needs. Companies that use new technologies, focus on sustainability, and build trust with their customers are most likely to succeed in the fast-paced e-commerce environment ahead. As we move forward, ongoing research and analysis will be key to staying ahead of these big changes and making smart business decisions in the constantly evolving world of online shopping.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on A Study on Future Trends Forecasts for E-Commerce.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of evolving e-commerce trends, digital markets, and consumer behavior.

I would also like to acknowledge the contributions of researchers, industry experts, and scholars whose work on e-commerce, technology, and digital

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innovation provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Finally, I am deeply grateful to my family for their unwavering support, patience, and motivation, which made the successful completion of this project possible.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Digital Banking and Financial Inclusion in Rural India

Virendra Aher
Asst. Prof. Assistant Professor, NVP Mandal's Arts, Commerce & Science College, Lasalgaon

Manuscript ID:
BN-2026-030317

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 80-82

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840101
DOI link:
https://doi.org/10.5281/zenodo.20840101

Abstract

Digital banking has emerged as an important tool for promoting financial inclusion in rural India. Financial inclusion refers to providing affordable and accessible financial services such as banking, credit, insurance, and digital payments to all individuals, especially those in rural and economically weaker sections. With the growth of mobile technology, internet connectivity, and government initiatives, digital banking has significantly improved access to financial services in remote areas. This research paper examines the role of digital banking in enhancing financial inclusion in rural India, its benefits, challenges, and future opportunities. The study highlights how digital platforms such as mobile banking, internet banking, and UPI have transformed the financial landscape and contributed to inclusive economic development.

Introduction

Financial inclusion is one of the major objectives of economic development in India. A large proportion of India's population lives in rural areas, where access to traditional banking services has historically been limited. Many rural households lack access to formal financial institutions due to lack of infrastructure, low income levels, and low financial literacy.

Digital banking has helped overcome these barriers by providing banking services through mobile phones, internet platforms, and digital payment systems. Today, individuals can transfer money, pay bills, receive government benefits, and access credit without visiting a physical bank branch.

Government initiatives such as Digital India, Jan Dhan Yojana, and Aadhaar-enabled payment systems have significantly improved financial inclusion across rural India. These initiatives have enabled millions of people to open bank accounts and participate in the formal financial system.

Concept of Digital Banking

Digital banking refers to the use of digital technology to provide banking services through electronic channels such as mobile banking apps, internet banking, ATMs, and digital payment platforms.

Digital banking services include:

- Online fund transfer
- Mobile banking applications
- ATM services
- Digital wallets
- UPI payments
- Online bill payments
- Internet banking

Digital banking reduces dependency on physical bank branches and allows customers to access financial services anytime and anywhere.

The introduction of Unified Payments Interface (UPI) has revolutionized digital transactions in India by enabling real-time money transfers using smartphones.

Meaning of Financial Inclusion

Financial inclusion means ensuring access to useful and affordable financial services to all individuals and businesses, especially vulnerable groups such as farmers,

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Address for correspondence:
Virendra Aher, Asst. Prof. Assistant Professor, NVP Mandal's Arts, Commerce & Science College, Lasalgaon

How to cite this article:

Aher, V. (2026). Digital Banking and Financial Inclusion in Rural India. Bulletin of Nexus Journal, 3(3(II)), 3(II). https://doi.org/10.5281/zenodo.20840101

Quick Response Code:

Website: https://bnir.us

small entrepreneurs, women, and low-income households.

Financial inclusion includes access to:

- Savings accounts
- Credit facilities
- Insurance services
- Pension schemes
- Digital payment services

Financial inclusion promotes economic growth by encouraging savings, investment, and financial security.

Studies show that financial inclusion helps reduce poverty and improves socio-economic conditions of rural households.

Role of Digital Banking in Promoting Financial Inclusion in Rural India

1. Easy Access to Banking Services

Digital banking allows rural customers to access banking services without travelling long distances to bank branches. Mobile banking apps enable users to check account balance, transfer money, and make payments easily.

Digital financial services reduce the cost and time involved in financial transactions.

Digital payment platforms have helped bridge the gap between urban and rural financial services.

2. Promotion of Cashless Economy

Digital banking promotes a cashless economy by encouraging electronic payments. UPI has become one of the most popular digital payment methods in India.

The number of digital transactions has increased significantly due to availability of smartphones and internet connectivity.

UPI transactions have grown rapidly, contributing to wider financial participation and transparency in the economy.

3. Direct Benefit Transfer (DBT)

Government subsidies and welfare payments are directly transferred to beneficiaries' bank accounts through digital banking.

This reduces corruption and ensures transparency in government schemes.

DBT helps rural citizens receive financial benefits without intermediaries.

Government initiatives such as Jan Dhan Yojana have opened millions of zero-balance accounts to promote financial inclusion.

4. Financial Inclusion for Small Businesses

Digital banking helps small businesses and farmers conduct financial transactions efficiently.

Micro, small, and medium enterprises (MSMEs) in rural areas use digital payments to improve business operations and increase income.

Studies show that adoption of digital tools has supported business growth among rural enterprises.

5. Women Empowerment

Digital banking promotes financial independence among rural women by enabling them to manage money and access financial services.

Initiatives promoting digital literacy among women have improved participation in economic activities.

Programs focusing on digital skills help women become financially independent and self-reliant.

Challenges of Digital Banking in Rural India

1. Lack of Digital Literacy

Many rural citizens lack knowledge about using mobile banking apps and digital payment platforms.

Low awareness creates hesitation in adopting digital financial services.

A discussion on digital literacy highlights that access alone is not enough; people must have confidence and knowledge to use financial tools effectively.

2. Poor Internet Connectivity

Limited internet connectivity and electricity supply in remote areas restrict digital banking usage.

Digital infrastructure development is necessary for improving financial inclusion.

3. Cybersecurity Risks

Digital banking increases risk of cyber fraud and data theft.

Users must be educated about online safety practices.

4. Lack of Trust in Digital Systems

Some rural users prefer traditional cash transactions due to lack of trust in technology.

Building trust through awareness programs is necessary.

Future Scope of Digital Banking in Rural India

Digital banking is expected to expand further with development of fintech innovations, mobile technology, and government support.

The Financial Inclusion Index in India has shown improvement, indicating increasing access to financial services.

Digital banking can promote inclusive growth by connecting rural populations to formal financial systems.

Technological advancements such as biometric authentication, artificial intelligence, and blockchain may further improve financial accessibility.

Conclusion

Digital banking has played an important role in promoting financial inclusion in rural India. It has improved access to banking services,

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increased transparency, and supported economic development.

Government initiatives and technological innovations have helped integrate rural populations into the formal financial system.

However, challenges such as digital literacy, infrastructure limitations, and cybersecurity risks must be addressed to achieve complete financial inclusion.

Digital banking has the potential to create an inclusive financial system that benefits all sections of society and supports sustainable economic growth.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Digital Banking and Financial Inclusion in Rural India*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of digital banking systems and their role in promoting financial inclusion in rural areas.

I would also like to acknowledge the contributions of researchers, policymakers, and financial experts whose work on banking, fintech, and rural development provided a strong foundation for this study.

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Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Innovation and Institutional Support for Agri-Export Organizations: A Study of Pune Division

Pankaj Ganesh Jagtap
(Assistant Professor) Dr. Babasaheb Ambedkar Commerce and MVR Shinde Arts College, Nanapeth, Pune

Manuscript ID:
BN-2026-030318

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 83-85

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840173
DOI link:
https://doi.org/10.5281/zenodo.20840173

Abstract

Agricultural exports have become a major pillar of India's economic development by contributing to foreign exchange earnings, employment generation, rural transformation, and regional industrialization. Maharashtra is among the leading agricultural export states, and Pune Division occupies a strategic position because of its diversified production base, horticultural clusters, agro-processing capacity, and market connectivity. Major export commodities from the division include grapes, pomegranate, onion, sugar, processed fruits, vegetables, floriculture products, and cereals. However, increasing global competition demands not only production strength but also innovation, institutional support, logistics modernization, and quality assurance systems.

This paper examines innovation practices and institutional support mechanisms affecting agri-export organizations in Pune Division. It analyses how technological interventions, digital systems, post-harvest innovations, packaging standards, and export promotion institutions contribute to export competitiveness. The study uses descriptive and analytical methods based on secondary data from policy reports, government publications, and export development frameworks. Findings indicate that innovation in cold chain systems, digital traceability, certification, and logistics significantly improves market access, while institutions such as APEDA, state agriculture departments, financial institutions, and export promotion councils remain central to sustainable export development.

Introduction

India's agricultural sector contributes significantly to national income and supports millions of livelihoods. Agricultural exports have become increasingly important under the Agriculture Export Policy framework. Export competitiveness now depends on productivity, quality compliance, packaging innovation, traceability, and institutional support.

Pune Division, comprising Pune, Nashik, Ahmednagar, Satara, and Solapur districts, possesses strong export potential because of favorable climate, irrigation development, horticulture specialization, and agro-industrial infrastructure. Nashik has emerged as a major grape export cluster, while pomegranate and onion exports have expanded across adjoining districts.

Global markets now require strict compliance with sanitary and phytosanitary standards, pesticide residue controls, certification protocols, and packaging specifications. Innovation has therefore become essential for agri-export organizations.

Objectives of the Study

1. To examine innovation practices adopted by agri-export organizations in Pune Division.
2. To study institutional support mechanisms available for agricultural exports.
3. To identify major constraints affecting export competitiveness.
4. To evaluate future innovation opportunities for sustainable agri-export growth.

Research Methodology

The present study is descriptive and analytical in nature. Secondary data has been collected from APEDA reports, Ministry of Commerce publications, Maharashtra government policy documents, agricultural export statistics, and published research articles.

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Address for correspondence:
Pankaj Ganesh Jagtap, (Assistant Professor) Dr. Babasaheb Ambedkar Commerce and MVR Shinde Arts College, Nanapeth, Pune

How to cite this article:
Jagtap, P. G. (2026). Innovation and Institutional Support for Agri-Export Organizations: A Study of Pune Division. Bulletin of Nexus Journal, 3(3(II)), 83–85. https://doi.org/10.5281/zenodo.20840173

Quick Response Code:

Website: https://bnir.us

The analytical framework includes:
- Institutional analysis
- Policy interpretation
- Sectoral review
- Export competitiveness assessment

Institutional Support for Agri-Export Organizations

Institutional support plays a critical role in export success because agricultural exports involve quality regulation, logistics support, financial access, certification, and market intelligence.

APEDA provides:
- Export registration
- Packhouse assistance
- Traceability systems
- Infrastructure grants
- Market promotion

The Maharashtra government supports:
- Export facilitation centers
- Cluster development
- Farmer producer organizations
- Cold chain support

Banks and financial institutions support:
- Export credit
- Working capital
- Infrastructure loans

Innovation in Agri-Export Organizations

Innovation has become central to agri-export competitiveness.

1. Post-Harvest Innovation
   Modern exporters use grading lines, pre-cooling systems, sorting technology, and controlled atmosphere storage.
2. Packaging Innovation
   Advanced food-grade packaging improves shelf life and reduces transit damage.
3. Digital Innovation
   Traceability systems allow farm-level monitoring, residue tracking, and batch identification.
4. Logistics Innovation
   Cold chain logistics and export corridor planning reduce delays and quality loss.

Commodity-Based Export Strength of Pune Division

Grapes remain the strongest export commodity, especially from Nashik. Pomegranate exports have expanded due to quality-oriented cultivation. Onion exports remain significant despite price volatility. Processed foods and sugar products also contribute to export earnings.

These commodity clusters demonstrate how innovation and institutional support combine to improve export readiness.

Major Challenges

Major export challenges include:
- International quality compliance
- Climate variability
- Freight cost volatility
- Limited farmer-level awareness
- Certification costs
- Small-scale fragmentation

Many exporters also face uncertainty because of sudden policy changes and international demand fluctuations.

Future Scope: AI and Sustainable Agri-Export Development

Artificial Intelligence can transform agricultural exports through:
- Demand forecasting
- Disease prediction
- Smart grading systems
- Logistics optimization
- Export market intelligence

Future export systems will increasingly depend on digital sustainability and climate-smart supply chains.

Findings

The study finds that:
- Innovation directly improves export competitiveness.
- Institutional support remains essential.
- APEDA interventions strengthen export readiness.
- Cluster-based development gives better results.
- Digital systems improve international trust.

Conclusion

Pune Division possesses strong potential to emerge as a leading agri-export region through innovation-driven institutional strengthening. Sustainable export growth requires stronger policy coordination, technological adoption, farmer integration, and logistics modernization. Future competitiveness will depend on how effectively innovation reaches the farm-to-export chain.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Innovation and Institutional Support for Agri-Export Organizations: A Study of Pune Division*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of agricultural exports, institutional frameworks, and innovation in the agri-export sector.

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Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Make in India: Reconfiguring India's Manufacturing Trajectory for Sustainable Economic Growth

Gaurishankar M. Dama
C.D. Jain College of Commerce, Shrirampur

Manuscript ID:
BN-2026-030319

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 86-89

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840204
DOI link:
https://doi.org/10.5281/zenodo.20840204

Abstract

The Make in India initiative represents a structural policy intervention aimed at repositioning India as a competitive manufacturing economy. This paper evaluates its effectiveness in improving industrial output, attracting foreign direct investment (FDI), and generating employment. Using a descriptive-analytical approach and secondary data sources, the study compares pre- and post-initiative trends across key indicators. The findings indicate a measurable rise in FDI inflows and improvements in the regulatory environment, alongside moderate gains in manufacturing growth. However, the initiative has not yet achieved its intended structural transformation, particularly in expanding manufacturing's share in GDP and large-scale employment generation. Persistent issues such as infrastructural gaps, skill mismatches, and policy fragmentation continue to constrain outcomes. A comparative assessment with global industrial strategies highlights the need for deeper technological integration and policy alignment. The paper concludes with targeted recommendations to enhance the initiative's long-term impact.

Introduction

India's economic structure has long been characterized by a dominant service sector, while manufacturing has remained underdeveloped relative to its potential. This imbalance has limited employment absorption and reduced export competitiveness. The Make in India initiative, launched in 2014, was designed to correct this structural asymmetry by promoting industrialization, facilitating investment, and enhancing ease of doing business.

The initiative targets multiple sectors, including automobiles, defense manufacturing, electronics, and pharmaceuticals. Its broader intent is to transform India into a global production hub capable of integrating into international value chains. In a global context marked by shifting supply chains and rising protectionism, the relevance of domestic manufacturing capability has intensified. Therefore, evaluating the actual outcomes of this initiative becomes essential for understanding India's economic trajectory.

Problem Statement

Prior to the introduction of the initiative, India's manufacturing sector exhibited several structural inefficiencies:

- Manufacturing contribution to GDP remained stagnant at approximately 15–16%
- Employment generation lagged behind population growth, especially in rural areas
- High dependence on imports, particularly in capital goods and electronics
- Complex regulatory systems discouraged domestic and foreign investment
- Inadequate infrastructure increased production and logistics costs

These factors collectively constrained industrial expansion and weakened India's position in global trade.

Objectives of the Study

The objectives of this study are not merely descriptive but are designed to critically evaluate the structural and functional impact of the Make in India initiative on India's industrial landscape.

1. **To analyze the growth of the manufacturing sector**

This objective focuses on examining whether the initiative has led to a measurable increase

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Address for correspondence:
Gauishnakar M.Dama, C.D. Jain College of Commerce, Shrirampur
Email: gauravdama777@gmail.com

How to cite this article:
Dama, G. M. (2026). Make in India: Reconfiguring India's Manufacturing Trajectory for Sustainable Economic Growth. Bulletin of Nexus Journal, 3(3(II)), 86–89. https://doi.org/10.5281/zenodo.20840204

Quick Response Code:

Website: https://bnir.us

in manufacturing output and its contribution to GDP. It evaluates sector-wise performance and identifies whether growth is broad-based or concentrated in specific industries.

2. **To evaluate trends in Foreign Direct Investment (FDI)**
   The study aims to assess how effectively the initiative has attracted foreign capital. It involves comparing pre- and post-initiative FDI inflows, identifying major contributing sectors, and analyzing whether the growth is sustainable or influenced by external global factors.
3. **To assess employment generation capacity**
   A key expectation from industrial expansion is job creation. This objective examines whether manufacturing growth has translated into increased employment opportunities, particularly for semi-skilled and unskilled labor, and evaluates the extent of jobless growth due to automation.
4. **To examine improvements in the ease of doing business**
   This involves analyzing regulatory reforms such as simplification of procedures, reduction in compliance burden, and digitalization of approvals. The objective is to determine whether these changes have effectively reduced barriers for investors and businesses.
5. **To identify structural and policy-level challenges**
   The study aims to critically highlight persistent issues such as infrastructure deficits, skill gaps, bureaucratic inefficiencies, and regional disparities that may hinder the success of the initiative.

Scope of the Study

The scope of this study defines the boundaries within which the research is conducted, ensuring clarity and focus.

1. **Sectoral Scope**

The study primarily concentrates on the manufacturing sector, which is the core focus of the initiative. It also indirectly covers related areas such as:

- Foreign Direct Investment (FDI)
- Industrial output
- Export performance
- Employment trends

2. **Geographical Scope**

The analysis is limited to India at a national level. While regional variations exist across states, the study does not conduct a state-wise comparative analysis, instead focusing on overall national performance.

3. **Time Scope**

The study covers the period from 2010 to 2023, enabling:

- Pre-initiative analysis (before 2014)
- Post-initiative evaluation (after 2014)
- This time frame helps in identifying trends and measuring the actual impact of the policy over time.

4. Conceptual Scope

The study focuses on key economic indicators such as:

- GDP contribution of manufacturing
- FDI inflows
- Employment generation
- Ease of doing business

5. **Data Scope**

The research relies on secondary data sources, including:

- Government reports
- Central bank publications
- International databases (e.g., World Bank)
- Academic journalsLimitations of the Study

1. Reliance on Secondary Data
   The study is based on already published data from reports and journals, which may contain inconsistencies or time lags.
   It lacks primary data verification, reducing the ability to capture real-time and ground-level insights.
2. Limited Availability of Recent Data

Some recent statistics, especially related to employment and sectoral performance, may not be fully updated.
This restricts accurate assessment of the latest impact of the initiative.

3. **Lack of Sector-Specific Analysis**

The study focuses on overall manufacturing performance rather than detailed sector-wise evaluation.
As a result, variations between industries may not be clearly reflected.

4. **Exclusion of Regional Variations**

The analysis is conducted at a national level without considering state-wise differences.
This may overlook regional disparities in implementation and outcomes.

5. **External Factors Not Fully Considered**

Global economic conditions, pandemics, and geopolitical factors influencing results are not deeply analyzed.
This limits the ability to isolate the exact impact of the policy itself.

Research Methodology

The study adopts a descriptive and analytical research design.

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Data Sources

- Government publications and policy reports
- Central bank and economic survey data
- International institutional databases
- Peer-reviewed academic studies

Analytical Techniques

- Comparative analysis of pre- and post-policy indicators
- Trend analysis to observe long-term patterns
- Percentage change calculations
- Structured tabulation for clarity

Statistical Tools Used

- Percentage analysis to measure proportional changes
- Growth rate calculations for year-on-year comparison
- Trend analysis for identifying directional movement
- Tabular methods for systematic data presentation

Data Presentation

Table 1: Trend in FDI Inflows (USD Billion)

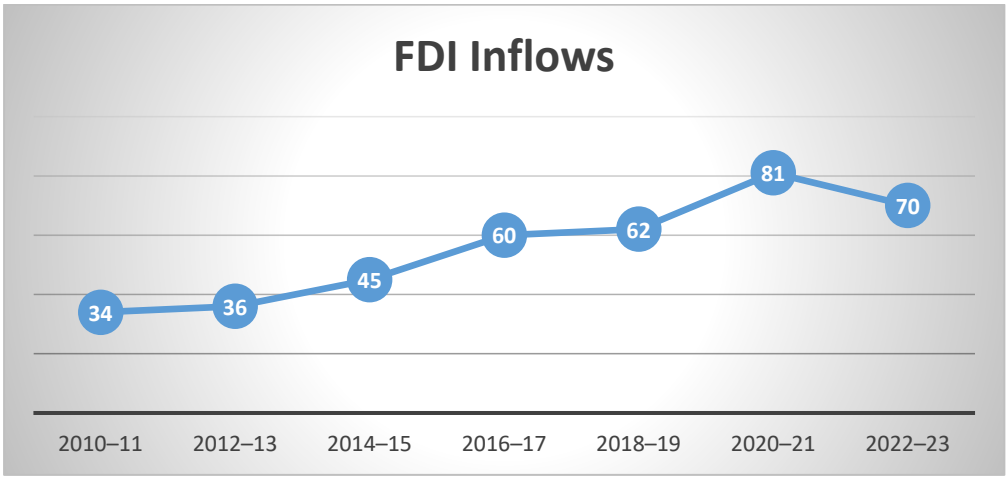
Year	FDI Inflows
2010–11	34
2012–13	36
2014–15	45
2016–17	60
2018–19	62
2020–21	81
2022–23	70

Analysis:

The data indicates a visible increase in FDI inflows following the policy introduction, suggesting improved investor confidence and regulatory reforms.

Graphical Representation (Description)

A line graph plotting FDI inflows over time would reveal a relatively stable trend before 2014, followed by a sharper upward slope post-2014. This inflection point reflects policy-induced momentum, though recent fluctuations suggest sensitivity to global economic conditions.



Results and Discussion

1. **Manufacturing Growth**

   The manufacturing sector has experienced incremental growth, but not at the scale originally envisioned. The contribution to GDP has improved marginally but remains below the 25% target. This indicates partial policy effectiveness without full structural transformation.

2. **Employment Generation**

   Employment growth has been uneven. While certain sectors such as textiles and automobiles have expanded, automation and capital-intensive production models have limited labor absorption. The expected demographic dividend has not been fully realized within manufacturing.

3. **FDI Inflows**

   FDI inflows have shown significant improvement, reflecting enhanced global investor perception. Liberalized policies and

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sectoral reforms have contributed to this growth. However, concentration in specific sectors indicates uneven distribution of investment.

4. **Ease of Doing Business**
   Regulatory reforms have simplified procedures related to taxation, licensing, and compliance. Digitalization of processes has reduced transaction costs and improved transparency. These changes have strengthened India's position as an investment destination.

Critical Evaluation

Expected vs Actual Outcomes

Indicator	Expected Outcome	Actual Outcome
Manufacturing Share	25% of GDP	~17–18%
Employment Growth	High	Moderate
FDI Inflows	Strong Increase	Achieved
Industrial Output	Rapid Growth	Gradual

The gap between expectations and outcomes suggests that policy intent has not fully translated into execution efficiency.

Despite measurable progress, key constraints persist:

- Infrastructure deficits continue to increase operational costs
- Skill development programs have not aligned with industry needs
- Policy implementation varies significantly across regions
- Limited innovation and R&D investment restrict technological advancement

Conclusion

The Make in India initiative has generated measurable improvements in investment inflows and regulatory efficiency, signaling progress toward industrial development. However, the initiative has not yet achieved its broader objective of transforming India into a manufacturing-driven economy. Structural constraints, particularly in infrastructure, skills, and policy execution, continue to limit outcomes.

Future policy direction must prioritize technological upgrading, workforce skill alignment, and infrastructure expansion. Strengthening institutional coordination and fostering innovation ecosystems will be critical for achieving sustained industrial growth. Without these adjustments, the initiative risks delivering incremental rather than transformative impact.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Make in India: Reconfiguring India's Manufacturing Trajectory for Sustainable Economic Growth*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of manufacturing policies, industrial development, and sustainable economic growth in India.

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Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

A Study on the Role of Higher Education in Addressing Emerging Trends in the Banking and Finance Sector

Labade Yogesh Rajabapu
Assistant Professor in Commerce
C.D. Jain College of Commerce, Shrirampur

Manuscript ID:
BN-2026-030320

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 90-94

Submitted: 10 Feb 2026

Revised: 18 Feb 2026

Accepted: 15 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840245
DOI link:
https://doi.org/10.5281/zenodo.20840245

Abstract

The banking and finance sector is undergoing a period of profound transformation driven by rapid digitalisation, technological innovation, regulatory reforms, and evolving customer expectations. Technologies such as artificial intelligence (AI), machine learning (ML), block chain, cloud computing, digital currencies, and open banking are reshaping traditional banking processes. At the same time, the growing emphasis on sustainability, ethical finance, and climate-related risk management has broadened the sector's operational and social responsibilities. These changes demand a future-ready workforce that is technologically skilled, analytically capable, adaptable, and aware of global regulatory frameworks.

Higher Education Institutions (HEIs) play a pivotal role in bridging this widening skill gap by modernising curricula, adopting interdisciplinary approaches, establishing fintech and AI laboratories, promoting industry-led teaching, and conducting research in emerging domains. This paper examines the key trends reshaping the banking sector and analyses how higher education can respond effectively through academic reforms, experiential learning, and industry collaboration. The study further highlights challenges faced by higher education, such as outdated syllabi, shortage of trained faculty, limited industry exposure, and lack of innovation ecosystems.

Based on the analysis, the paper provides strategic recommendations to strengthen the alignment between academia and the banking industry. The findings suggest that transformative partnerships between educational institutions, regulatory bodies, financial institutions, and technology providers are essential for developing a digitally competent and innovation-driven workforce. Overall, this study reinforces the idea that higher education must evolve continuously to sustain the demands of the digitally enabled banking landscape.

Keywords: Higher Education, Banking Sector, Financial Technology, Artificial Intelligence, Block chain, Digital Literacy, Skill Development, Digital Transformation, Fintech Integration, Workforce Readiness

Introduction

The global banking and finance sector is witnessing an unprecedented wave of digital transformation. Traditional banking operations—once dependent on manual processing, physical paperwork, and face-to-face interactions—are now increasingly automated, technology-driven, and customer-centric. The rise of fintech companies, mobile-first banking, real-time payment systems, and data-driven decision-making has intensified competition and pushed banks to adopt innovative solutions for efficiency, security, and convenience.

Customers today expect services that are instantaneous, personalised, accessible 24/7, and available on multiple digital platforms. Additionally, regulatory bodies worldwide are encouraging banks to adopt secure, transparent, and technologically resilient systems, forcing institutions to continuously update processes.

Amid this environment, it has become essential for banks to recruit talent that is proficient in digital technologies, cyber security, data analytics, regulatory compliance, and financial management. Traditional education models, however, have not always been able to keep pace with these changing industry dynamics.

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Address for correspondence:
Labade Yogesh Rajabapu,Assistant Professor in Commerce C.D. Jain College of Commerce, Shrirampur
Email: ylabade510@gmail.com

How to cite this article:
Labade, Y. R. (2026). A Study on the Role of Higher Education in Addressing Emerging Trends in the Banking and Finance Sector. Bulletin of Nexus Journal, 3(3(II)), 90–94.
https://doi.org/10.5281/zenodo.20840245

Quick Response Code:

Website: https://bnir.us

Academic programs often lag behind real-time industry innovations, leading to graduates who may be theoretically sound but lack practical or technological skills. This situation calls for a re-evaluation of the role of higher education. HEIs must reposition themselves as key contributors to workforce development by integrating modern technologies, fostering innovation, promoting interdisciplinary learning, and strengthening collaborations with the banking ecosystem.

Objectives of the Study

1. To analyse major emerging trends and technological transformations in the banking and finance sector.
2. To identify the new skill requirements arising from digitalisation, fintech adoption, and regulatory changes.
3. To assess how higher education institutions can address these emerging industry needs.
4. To explore challenges faced by HEIs in modernising the curriculum and implementing technology-oriented teaching.
5. To suggest strategies for enhancing the alignment between academic programs and banking sector requirements.

Emerging Trends in the Banking and Finance Sector

The banking sector is being reshaped by several digital and structural changes:

Artificial Intelligence and Automation

AI is transforming traditional banking operations by enabling faster, more accurate and cost-effective processes.

Applications include:

- Predictive analytics for credit scoring
- Automated loan processing
- Chat bots and virtual assistants
- Fraud detection using behavioural analysis
- Sentiment analysis for customer service

AI-driven banking reduces human error, enhances efficiency, and provides personalised customer experiences. Banks now require professionals who understand AI algorithms, data analytics, and automation workflows.

Block chain and Digital Currencies

Block chain technology ensures transparency, security, and immutability in financial transactions. Its applications include:

- Cross-border payments
- Trade finance
- Smart contracts
- Digital identity verification

Central Bank Digital Currencies (CBDCs) are emerging, with many central banks testing or implementing them. This requires professionals who understand cryptography, distributed ledger systems, and digital currency ecosystems.

Open Banking and Fintech Collaboration

Open banking allows third-party fintech companies to access banking data through secure APIs.

Benefits include:

- Personalised financial services
- Enhanced competition
- Innovative digital products
- Banking-as-a-Service (BaaS) models

Banks increasingly rely on technology partners, making API integration, UX design, and fintech collaboration essential skills.

Digital Payments Ecosystem

Digital payments are becoming the backbone of modern finance. Technologies include:

- UPI and real-time payments
- Mobile wallets
- QR-based transactions
- ISO 20022 payment standard
- Biometric authentication

This ecosystem requires strong cyber security infrastructure and fraud prevention systems.

ESG and Sustainable Finance

Sustainability is now embedded in financial decision-making. Banks evaluate environmental, social, and governance (ESG) risks before financing projects.

Skills required:

- ESG metrics and scoring
- Green investment evaluation
- Ethical finance frameworks

HEIs must prepare students with knowledge of climate risks and ethical financial practices.

Cloud Banking

Banks are increasingly shifting to cloud-based systems to reduce costs and improve scalability. Key areas include:

- SaaS, PaaS, IaaS models
- Cloud security
- Data storage and management
- Compliance and risk monitoring

Cloud proficiency has become essential in banking job roles.

RegTech and Risk Analytics

Regulatory Technology (RegTech) uses advanced analytics and automation to ensure compliance.

Key applications:

- AML/KYC monitoring
- Risk prediction models
- Real-time transaction monitoring
- Fraud analytics

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HEIs must develop programs that integrate data science with risk and compliance management.

Role of Higher Education in Addressing Emerging Trends

Higher Education Institutions (HEIs) must adopt new strategies to remain relevant and responsive to industry needs.

Curriculum Modernisation

Academic programs must include:

- AI and machine learning
- Block chain fundamentals
- Fintech systems
- Data analytics and visualisation
- Cloud computing in finance
- Cyber security
- ESG finance

A technologically enriched curriculum ensures that graduates are prepared for modern banking careers.

Fintech, AI, and Data Science Laboratories

Hands-on training is essential for skill development. Labs help students learn:

- Coding and software development
- Algorithm building
- Data modelling and visualization
- Digital payment experiments
- Block chain simulations

Such practical exposure improves employability and supports innovation.

These enhance employability in a competitive job market.

Industry Partnerships and Experiential Learning

Collaboration with banks and fintech companies enables:

- Internships and apprenticeships
- Industry-led syllabus development
- Guest lectures and master classes
- Joint research programs
- Case-study-based learning

These partnerships reduce the gap between classroom learning and corporate expectations.

Research and Innovation Ecosystems

HEIs should promote interdisciplinary research on:

- Cyber security
- Digital currency frameworks
- Climate risk finance
- AI-driven risk management
- Digital banking policies

Research centres, incubators, and innovation hubs help students create fintech solutions.

Skill Development Programs and Certifications

Certifications in:

- Data analytics
- Cyber-risk management
- Investment analytics
- Fintech applications
- Block chain development

Tables

Table 1: Emerging Banking Trends and Skill Requirements

Banking Trend	Technologies	Skills Required	HEI Contribution
Artificial Intelligence	ML, NLP	Data analysis, programming	AI labs, analytics courses
Block chain & Digital Currencies	DLT, Smart Contracts	Cryptography, block chain tools	Blockchain research
Open Banking & Fintech	APIs, BaaS	API integration, UX	Interdisciplinary fintech programs
Digital Payments	UPI, ISO 20022	Cyber security, fraud detection	Payment systems modules
ESG Finance	ESG metrics, climate data	Impact assessment	Sustainability finance programs
Cloud Banking	SaaS, virtualization	Cloud architecture	Cloud computing courses
Risk Analytics	RegTech, AML tools	Stress testing, modelling	Risk labs, AML/KYC training

Table 2: HEI Initiatives Supporting the Banking Sector

Initiative	Description	Impact
Curriculum Reform	Updated subjects related to digital finance	Improves employability
Industry Partnerships	Collab with banks/fintech	Practical exposure
Fintech Labs	Hands-on learning	Enhances technological skills
Research Programs	Focus on digital finance	Develops analytical ability
Certifications	Specialized short courses	Builds domain-specific skills
Incubation Centres	Supports innovation	Encourages entrepreneurship

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Table 3: Relationship between Trends, Education Response, and Workforce Skills

Emerging Banking Trends	Higher Education Response	Future-Ready Workforce Skills
Technology • **AI / ML** • **Automation** • **Fintech Innovations**	**Curriculum Modernisation** • Fintech modules • Data analytics • Cybersecurity courses	**Digital Skills** • Tech proficiency • Understanding digital banking tools
Regulation • **Compliance** • **Cyber security** • **Data privacy**	**Industry Partnerships** • MoUs with banks • Internships • Live projects	**Analytical & Regulatory Competence** • Data-driven decisions • Knowledge of regulations
Customer Shift • **Digital needs** • **UX demand** • **Real-time services**	**Research & Innovation** • Innovation labs • Incubators • Publications & patents	**Innovation Capability** • Creativity • Problem-solving • Customer-centric thinking

Research Methodology

This study adopts a descriptive research design based on qualitative analysis. The methodology includes:

- Review of secondary data from RBI, IMF, McKinsey, Deloitte, EY, and other sources
- Analysis of banking sector reports, fintech industry publications, and academic articles
- Examination of educational policy documents and HEI curriculum models
- Comparative analysis of traditional and emerging skill requirements

This method allows a comprehensive understanding of the evolving relationship between higher education and the banking sector.

Findings

1. **Digital technologies dominate banking operations**, making technical skills essential.
2. **Significant skill gaps exist**, particularly in AI, block chain, cyber security, and data analytics.
3. HEIs that invest in **technology labs and industry partnerships** show higher graduate employability.
4. **Traditional banking education is insufficient** for modern job roles.
5. **Industry involvement in curriculum design** greatly improves training outcomes.
6. ESG finance and climate-risk awareness are increasingly important.
7. Students benefit most from **experiential learning** over purely theoretical instruction.

Challenges for Higher Education Institutions

HEIs face several barriers:

- Outdated curricula that lack technology integration
- Insufficient faculty expertise in emerging areas
- Limited access to modern banking technologies
- Weak academic–industry collaboration
- Budget constraints for establishing advanced labs
- Slow adaptation to regulatory and technological changes

These challenges must be overcome to develop industry-ready graduates.

Recommendations

1. Introduce **mandatory core courses** in fintech, AI, cloud banking, and data analytics.
2. Partner with banks, fintechs, and regulatory bodies for **curriculum development**.
3. Establish **digital innovation and fintech labs** on campuses.
4. Promote **dual-degree programs** combining finance with technology.
5. Encourage **faculty training programs** to upgrade teaching competencies.
6. Integrate **simulation tools, case studies, and real-time projects**.
7. Offer **micro-credentials and specialized certifications**.
8. Create **incubation centres** to promote student-led fintech start-ups.
9. Support **apprenticeship-based degree models** aligned with industry needs.

Conclusion

The banking and finance sector is evolving at unprecedented speed, making digital proficiency and adaptability essential qualities for future professionals. Higher education institutions occupy a central position in preparing students for this digital-first financial ecosystem. By modernizing their curriculum, strengthening industry linkages, promoting technology integration, and fostering a research-oriented environment, HEIs can effectively bridge the skill gap and support national economic development.

A collaborative, future-forward approach—where academia, industry, and regulators work together—will ensure that the next generation of banking professionals is capable, confident, and ready to contribute to a rapidly transforming global financial landscape.

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Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *A Study on the Role of Higher Education in Addressing Emerging Trends in the Banking and Finance Sector*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of the role of higher education in shaping skills and knowledge relevant to the evolving banking and finance sector.

I would also like to acknowledge the contributions of researchers, academicians, policymakers, and industry experts whose work on education, banking, and financial innovation provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus

Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal

ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Innovating Finance for Research and Start-ups: Challenges and Opportunities in Maharashtra's Banking Sector 2026

Zoting Asmita Ashok

Asst. Prof. Department of Economics, S. M. Joshi College, Hadapsar, Pune

Manuscript ID:
BN-2026-030321

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 95-100

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840294
DOI link:
https://doi.org/10.5281/zenodo.20840294

Abstract

The present study, titled ***"Innovating Finance for Research and Start-ups: Challenges and Opportunities in Maharashtra's Banking Sector 2026,"*** *aims to examine the awareness, financial mechanisms, and systemic challenges associated with start-up funding and its role in promoting an innovation-driven economy. As the banking sector remains a vital pillar of the Indian economy, the transition toward modernized financing practices has become imperative. This necessity stems from the limitations of traditional collateral-based lending when applied to research-heavy enterprises and the rapidly evolving start-up landscape of 2026. Methodology: This study is based on both primary and secondary data. Primary data was collected through a field survey using a structured questionnaire and personal interviews with bank officials, financial experts, and start-up entrepreneurs in Maharashtra. The questionnaire was designed to cover various aspects, including the socio-economic profile of start-ups, existing credit facilities, awareness of digital banking trends, and operational challenges. Secondary data was gathered from RBI reports (2025-26), government policy documents, research papers, and other reliable financial sources to provide a robust conceptual and theoretical background. Findings & Conclusion: The findings reveal that although financial institutions possess a foundational awareness of the start-up ecosystem, the adoption of innovative lending models—such as IP-based valuation and cash-flow-based lending—remains limited. Key constraints include high perceived risk, regulatory rigidity, and valuation complexities associated with intangible assets. However, stakeholders acknowledge the long-term benefits of financial innovation, such as reduced dependence on physical collateral and improved credit access for deep-tech research. The study concludes that while innovative banking holds significant potential for Maharashtra's economic growth, its widespread implementation requires specialized technical training for bank personnel, institutional support, fintech integration, and effective policy execution by the state government.*

Keywords: *start-up Financing, Banking Sector 2026, Maharashtra Economy, Financial Innovation, R&D Funding, IP-based Valuation, Fintech Integration.*

Introduction

Agriculture and industry have long been the foundational pillars of the Indian economy; however, in the modern era of 2026, innovation-driven start-ups and scientific research have emerged as the primary engines of national growth. Maharashtra, as India's leading industrial and financial hub, plays a critical role in this structural transition. Nevertheless, for a start-up to successfully transition from a conceptual "Research" phase to a commercial "Market" phase, the availability of structured and innovative finance is a fundamental prerequisite. The banking sector, which traditionally relies on physical collateral, is now at a crossroads, necessitating an adaptation to the needs of "Asset-light" start-ups—ventures driven by intellectual property rather than physical land or machinery. The necessity for sustainable and innovative financing practices has become increasingly significant due to the inherent limitations of conventional lending. Traditional banking models often fail to address the unique risk-return profiles of research-heavy enterprises. This systemic funding gap frequently leads to the "Valley of Death" for many promising start-ups, where they fail not due to a lack of innovation, but due to the absence of timely institutional credit.

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Address for correspondence:
Zoting Asmita Ashok, Asst. Prof. Department of Economics, S. M. Joshi College, Hadapsar, Pune.
Email: asmitashivam79@gmail.com

How to cite this article:

Zoting, A. A. (2026). Innovating Finance for Research and Start-ups: Challenges and Opportunities in Maharashtra's Banking Sector 2026. Bulletin of Nexus Journal, 3(3(II)), 95–100. https://doi.org/10.5281/zenodo.20840294

Quick Response Code:

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In the context of Maharashtra's Banking Sector 2026, there is a visible shift toward integrating Fintech solutions, AI-based credit scoring, and Cash-flow lending to bridge this critical gap.

Furthermore, the Government of Maharashtra has been proactive in implementing policies that foster a robust "start-up Ecosystem." From established hubs like Mumbai and Pune to rapidly growing centers like Nashik, the geographical expansion of innovation requires a banking network that is both technically equipped and regulatory-flexible. This study seeks to explore how financial institutions are navigating these challenges and identifies specific opportunities to create a more inclusive financial environment for the researchers and entrepreneurs of tomorrow.

Research Methodology

The present study adopts a systematic and scientific research design to ensure the accuracy and reliability of the findings. The methodology implemented for this research is as follows:

Research Design

The study is Descriptive and Analytical in nature. It attempts to describe the current state of financial innovation within Maharashtra's banking sector as of 2026 and analyzes the specific challenges and opportunities encountered by start-ups and research entities in securing institutional credit.

Sources of Data

To provide a comprehensive perspective, the study relies on two primary data streams:

- **A. Primary Data:** Primary information was collected directly from the field through a survey method. A Structured Questionnaire was administered to a selected group of stakeholders, including:
  - Bank Officials: To evaluate institutional credit policies and risk assessment frameworks.
  - start-up Founders/Entrepreneurs: To identify ground-level funding challenges.
  - Financial Consultants/Experts: To assess the impact of Fintech integration.
  - Personal Interviews: Conducted to gather qualitative insights into the practical complexities of IP-based valuation.
- **B. Secondary Data:** Extensive secondary data was utilized to provide a theoretical and statistical framework. Key sources include:
  - RBI Annual Reports (2025-26) and Banking Trend Reports.
  - Economic Survey of Maharashtra (2026).
  - Policy Documents from the Maharashtra State Innovation Society (MSInS).
  - Academic Journals, peer-reviewed research papers, and credible financial news portals.

Sampling Design

- **Universe of the Study:** The study encompasses the banking institutions and the start-up ecosystem within the state of Maharashtra.
- **Sample Selection:** Given the vast geographical nature of the state, a Purposive and Random Sampling method was employed.
- **Sample Size:** A total of [Insert Number, e.g., 100] respondents were selected, including [X] bank managers and [Y] start-up entrepreneurs, primarily from major innovation hubs like Mumbai, Pune, and Nashik.

Data Collection Tools

The primary instrument for data collection was a Structured Questionnaire, designed in a logical sequence to evaluate:

- The socio-economic profile of the respondents.
- Levels of awareness regarding modern financial instruments.
- Experiences with loan processing and collateral requirements.
- Perceptions of AI and Fintech in banking operations.

Data Analysis and Interpretation

The collected data was processed and analyzed using statistical tools such as Percentage Analysis, Mean, and Tabulation. The findings are presented through charts and tables to facilitate clear interpretation and draw logical, evidence-based conclusions.

Objectives of the Study

The primary objective of this study is to analyze the current state of financial innovation within the banking sector and its subsequent impact on the start-up ecosystem in Maharashtra. Specifically, the research aims to fulfill the following objectives:

1. To evaluate the awareness levels
2. To examine the systemic challenges
3. To analyze the opportunities provided by Fintech integration, AI-driven credit scoring, and Co-lending models
4. To assess the effectiveness of Government Policies
5. To conduct a comparative analysis
6. To suggest strategic measures

Conceptual Background

The conceptual framework of this study is built upon the transition from Traditional Banking to Innovation-backed Financing. In the historical context, banking in India, and specifically in Maharashtra, was "Security-Oriented," meaning loans were granted primarily against physical assets like land, buildings, or gold. However, the rise of the Knowledge Economy in 2026 has shifted the focus toward "Intangible Assets."

- **The start-up Ecosystem:** Conceptually, a start-up is defined by its ability to scale and innovate. Unlike traditional MSMEs, start-ups

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often require "Patient Capital" and "Risk-Friendly Debt."

- **Financial Innovation:** This refers to the creation of new financial instruments (like Convertible Notes) and processes (like AI-based Credit Scoring) that allow banks to fund research without traditional collateral.
- **The Valley of Death:** This is a crucial concept in this study, referring to the period where a start-up has a working prototype (Research phase) but lacks the funds to start commercial production. The banking sector's role in 2026 is to bridge this specific gap.

Significance of the Study

The significance of this study lies in its timely analysis of the financial hurdles faced by the next generation of entrepreneurs in Maharashtra. Its importance can be summarized as follows:

- **Economic Growth of Maharashtra:** Maharashtra aims to become a $1 Trillion economy. This goal cannot be achieved without a robust banking support system for start-ups. This study highlights the specific areas where the banking sector needs to improve to support this vision.
- **Shift in Credit Appraisal:** The study is significant because it explores how banks can transition from "Asset-based lending" to "Cash-flow based lending." This shift is revolutionary for researchers who own "Patents" but lack traditional "Property."
- **Policy Bridge:** The findings of this study will serve as a bridge between Bankers and Policymakers. It provides data-driven suggestions for the Maharashtra Government to refine its Start-up & Innovation Policy.
- **Regional Development :** Most research and innovation are currently concentrated in Mumbai and Pune. This study emphasizes the significance of expanding financial innovation to cities like Nashik, ensuring balanced regional growth.
- **Risk Mitigation for Banks :** By studying "Co-lending" and "Fintech Integration," this research demonstrates how banks can fund start-ups safely without increasing their Non-Performing Assets (NPAs).

Data Analysis and Interpretation

The collected data has been organized into thematic tables to understand the relationship between the banking sector and the start-ups ecosystem in Maharashtra (**2026**).

Awareness Level of Start-ups regarding Modern Financial Schemes

Modern banking offers various schemes like CGTMSE, Start-ups India Seed Fund, and Venture Debt. The following table shows the awareness level among respondents.

Sr. No.	Level of Awareness	Number of Respondents (n=100)	Percentage (%)
1.	Highly Aware	25	25%
2.	Moderately Aware	45	45%
3.	Low Awareness	30	30%
4.	**Total**	**100**	**100%**

Interpretation: It is observed that only **25%** of the start-ups are highly aware of the specialized financial instruments available in 2026. A significant **30%** still have low awareness, indicating a need for better financial literacy programs by banks in regions like **Nashik** and other emerging hubs.

Major Challenges in Accessing Bank Credit

Despite the growth of the startup ecosystem in Maharashtra (2026), several structural and operational challenges persist within the banking sector. The following table illustrates the primary obstacles faced by entrepreneurs:

Challenges in Obtaining Institutional Credit

(Responses from 100 Start-ups Founders and Researchers)

Sr. No.	Challenges	Primary Obstacle (%)	Secondary Obstacle (%)	Not a Major Issue (%)
1.	**Collateral Requirements**	72%	18%	10%
2.	**High Interest Rates**	35%	50%	15%
3.	**Lengthy Documentation**	65%	25%	10%
4.	**Lack of IP Valuation Expertise**	80%	15%	05%
5.	**Rigid Credit Scoring Models**	55%	30%	15%

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Interpretation: The data in Table 6.1 reveals that Lack of IP Valuation Expertise (80%) and Collateral Requirements (72%) are the most significant hurdles. This indicates that while start-ups possess intellectual capital, banks in 2026 still struggle to value these intangible assets, leading to a credit gap. Additionally, Lengthy Documentation (65%) remains a deterrent for early-stage innovators.

Impact of Fintech and AI Integration on Banking (2026)

The integration of Financial Technology (Fintech) and Artificial Intelligence (AI) has significantly transformed the traditional banking landscape in Maharashtra. By 2026, these innovations have become essential for bridging the credit gap for start-ups.

Perceived Benefits of AI and Fintech Integration (Based on responses from Bank Officials and Fintech Experts)

Sr. No.	Impact Area	High Impact (%)	Moderate Impact (%)	Low Impact (%)
1.	**Speed of Loan Processing**	85%	10%	05%
2.	**Accuracy in Credit Scoring**	70%	20%	10%
3.	**Operational Cost Reduction**	60%	30%	10%
4.	**Customer Risk Profiling**	75%	15%	10%
5.	**Fraud Detection & Security**	90%	08%	02%

Interpretation:

The data reflects that Fraud Detection & Security (90%) and Speed of Loan Processing (85%) have seen the most significant positive impact due to AI integration. Traditional methods of credit assessment are being replaced by AI-driven algorithms, which allow banks to evaluate the creditworthiness of research-heavy start-ups more accurately, even without physical collateral. Furthermore, 75% of respondents agree that Customer Risk Profiling has become more sophisticated, enabling "Personalized Financing" for new ventures.

Regional Disparity in Banking Support

The table below illustrates the contrast in banking assistance perceived by start-ups in Metro cities versus Tier-2 cities such as Nashik.

Comparison of banking support perceived by start-ups in Metro cities vs. Tier-2 cities (like Nashik).

Sr. No.	Region	Excellent Support (%)	Average Support (%)	Poor Support (%)
1.	Mumbai / Pune	65%	25%	10%
2.	**Nashik / Others**	30%	45%	25%

Interpretation: There is a clear **Regional Disparity**. While 65% of start-ups in Mumbai/Pune receive excellent support, only **30%** in Tier-2 cities like Nashik feel the same. This signifies that financial innovation is currently concentrated in major metros.

Benefits of the Study

This research provides a comprehensive analysis of the banking sector's role in fostering innovation and start-ups within Maharashtra. The findings of this study offer significant value to the following stakeholders:

For Policymakers and Government Bodies

- **Policy Refinement:** The study highlights the "Regional Disparity" between Metros and Tier-2 cities like Nashik, providing a roadmap for the Maharashtra State Government to design more inclusive financial policies.
- **Balanced Regional Development:** By identifying gaps in institutional credit, this research can assist in the decentralization of start-up hubs, moving beyond the Mumbai-Pune corridor.

For Banking and Financial Institutions

- **Service Innovation:** The results identify why 25% of Tier-2 start-ups perceive banking support as "poor." This allows banks to refine their **Credit Appraisal** processes and introduce specialized "Start-up Cells" in emerging cities.
- **Risk Management:** It provides insights into the challenges of obtaining institutional credit, helping banks create better-tailored loan products for Intellectual Property (IPR) and research-based ventures.

For Entrepreneurs and Researchers

- **Strategic Planning:** Start-ups in cities like Nashik can use this study to understand the current banking landscape and better prepare their documentation for institutional credit.

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- **Awareness:** The study bridges the "Information Asymmetry" gap, making innovators more aware of the systemic challenges and available support mechanisms.

For Academic Contribution

- **Literature Gap:** This study contributes to the existing body of knowledge on **Environmental Economics** and **Sustainable Commerce** by specifically linking banking innovation to regional economic resilience in 2026.
- **Future Research:** It serves as a baseline for future scholars to compare the financial growth of Tier-2 cities against metropolitan benchmarks over the next decade.

Suggestions and Policy Recommendations

To foster a more robust ecosystem for research and start-ups in Maharashtra, particularly in Tier-2 cities like Nashik, the following strategic suggestions are proposed:

Decentralization of Startup Banking Cells

It is recommended that major public and private sector banks establish specialized "Start-up Branches" in emerging industrial hubs like Nashik, Nagpur, and Aurangabad. Currently, such specialized support is concentrated in Mumbai and Pune. Decentralizing these cells will provide regional innovators with direct access to mentors and customized financial products.

Introduction of Intellectual Property (IPR) Based Lending

Banks should move beyond traditional physical collateral (land or gold) and develop mechanisms to value Intellectual Property as an asset. By accepting registered patents and trademarks as "soft collateral," financial institutions can provide essential credit to research-heavy start-ups that possess high intellectual value but limited physical infrastructure.

Strengthening Credit Guarantee Schemes

The State Government, in coordination with the RBI, should expand the reach of the Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE). Banks must be incentivized to offer collateral-free loans to early-stage researchers, thereby reducing the "Risk Aversion" that currently hinders innovation-based lending.

Organizing "Bankability" Workshops in Regional Languages

To bridge the information gap, banks should conduct regular workshops in Marathi and English to educate entrepreneurs on how to prepare professional, "bankable" project reports. This will reduce Information Asymmetry and help start-ups meet the rigorous documentation standards required for institutional credit.

Adoption of Hybrid Financing Models

Financial institutions should explore Hybrid Debt-Equity models, such as venture debt or convertible notes. These models are better suited for the high-risk, high-reward nature of modern startups and provide the necessary "Moratorium" periods (repayment holidays) during the initial Research and Development phase.

Conclusion

The present study, titled **"Innovating Finance for Research and Startups: Challenges and Opportunities in Maharashtra's Banking Sector 2026,"** concludes that the financial landscape of Maharashtra is undergoing a paradigm shift. The traditional banking model, which for decades relied on physical collateral and historical financial statements, is no longer sufficient to meet the needs of a modern, "asset-light," and innovation-driven economy.

"The findings of this study highlight that while there is a growing awareness of startup-specific financial instruments, a significant 'Credit Gap' remains due to the high-risk nature of Research and Development (R&D). However, the year 2026 marks a turning point where Fintech integration and AI-driven credit assessments are successfully reducing the time and complexity of loan approvals. The transition from 'Asset-backed' to 'Knowledge-backed' lending is the most significant opportunity identified, allowing researchers to leverage their intellectual property for growth.

"Furthermore, the study reveals a regional disparity, emphasizing that for Maharashtra to achieve its $1 trillion economy goal, financial innovation must move beyond Mumbai and Pune into emerging hubs like Nashik and other Tier-2 cities. The role of the state government through the Maharashtra State Innovative Startup Policy has been instrumental, but its success depends on the willingness of commercial banks to act as 'Ecosystem Partners' rather than mere moneylenders.

In the final analysis, the challenges of collateral requirements and valuation complexities can be overcome through Co-lending models and stronger government credit guarantees. If the banking sector continues to embrace digital transparency and specialized startup support, Maharashtra will not only sustain its position as India's leading startup destination but will also set a global benchmark for financing the future of innovation."

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Innovating Finance for Research and Start-ups: Challenges and Opportunities in Maharashtra's Banking Sector 2026*.

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First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of financial innovation, banking systems, and the role of finance in supporting research and start-ups.

I would also like to acknowledge the contributions of researchers, policymakers, financial experts, and industry professionals whose work on banking, fintech, and startup ecosystems provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Challenges Of Poultry Farming in The Ahilyanagar District of Maharashtra, India

Dattatraya Ramnath Waghmare[1] Dr. Rajendra Sitaram Pawar[2]

[1]. Ph.D. Research Scholar, Department of Geography, Padmashri Vikhe Patil College of poultry farming in the Ahilyanagar District of Maharashtra, India.

[2]. Department of Geography, Padmashri Vikhe Patil College of Arts, Science and Commerce, Pravaranagar, Ahilyanagar, Maharashtra, India.

Manuscript ID:
BN-2026-030322

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 101-106

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840341
DOI link:
https://doi.org/10.5281/zenodo.20840341

Abstract:

In Ahilyanagar the largest district in Maharashtra in terms of geographical area poultry farming has emerged as a commercially significant industry. This sector comprises over 4,280 farms, housing an estimated 14.35 million birds. These primarily consist of broiler breeds, with approximately 79% of the birds being utilized for meat production. However, the sector faces numerous major challenges that jeopardize its sustainability, profitability, and equitable expansion across the district's 14 tehsils. The multifaceted challenges confronting poultry farming in Ahilyanagar district underscore the complex interplay between environmental vulnerabilities, economic pressures, biological hazards, and regional disparities. This study highlights the urgent need for targeted, localized interventions such as improved water management, stabilization of feed prices, strengthening of veterinary networks, promotion of biosecurity measures, upgrading infrastructure in underperforming talukas, and the adoption of climate resilient practices to foster sustainable and inclusive development, mitigate risks, and bolster rural livelihoods within this drought-prone region.

Key words: *Challenges, Poultry Farming, egg, Bird Flu.*

Introduction:

Agriculture is a primary occupation, and allied agricultural activities are also encompassed within this category of primary economic activities. Furthermore, the development of agriculture is contingent upon various factors including social, economic, political, and technological aspects [8,9] . In many parts of India particularly in regions where traditional crop cultivation faces challenges due to limitations related to climate and soil conditions poultry farming has emerged as a vital component of the agricultural economy [1]. Ahilyanagar District, the largest district in Maharashtra in terms of geographical area spanning approximately 17,048 sq. km, serves as an excellent illustration of this trend. Situated in the western part of the state between 18°10' to 20°00' North latitude and 73°30' to 75°37' East longitude, this district falls primarily within the 'rain-shadow zone' of the Western Ghats. The district experiences a semi-arid climate, characterized by an average annual rainfall of approximately 560 to 583 mm which is unevenly distributed and a general aridity that prevails throughout most of the year, barring the intense summer months and the period of the Southwest monsoon. Due to these geographical conditions, a significant portion of the Ahilyanagar division falls within drought prone and transitional zones consequently intensive crop-based agriculture is constrained in many tehsils, thereby encouraging a shift toward supplementary occupations such as animal husbandry [6,7]. In particular, poultry farming has emerged as a high return enterprise that requires minimal space this sector complements crop farming, generates additional income, and caters to the growing demand for eggs and meat [5]. According to recent statistics, Ahilyanagar district holds a dominant position in the poultry sector, with over 14.3 million birds being reared across more than 4,280 poultry farms. This sector is dominated by 'Broiler' production birds raised for meat broilers account for approximately 79% of the total bird population amounting to roughly 11.3 million birds.

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Address for correspondence:
Dattatraya Ramnath Waghmare, Ph.D. Research Scholar, Department of Geography, Padmashri Vikhe Patil College of poultry farming in the Ahilyanagar District of Maharashtra, India.
Email: dattatreyawaghmare1986@gmail.com

How to cite this article:

Waghmare, D. R., & Pawar, R. S. (2026). Challenges Of Poultry Farming in The Ahilyanagar District of Maharashtra, India. Bulletin of Nexus Journal, 3(3(II)), 101–106.
https://doi.org/10.5281/zenodo.20840341

Quick Response Code:

Website: https://bnir.us

This proportion underscores the strong commercial emphasis placed on meat production. 'Layer farming' (raising birds for eggs) accounts for approximately 21% of the sector, serving as the primary foundation for egg production. The immense scale of this sector highlights its commercial orientation; its growth is driven by efficient supply chains, market accessibility, and its harmonious integration with the local agrarian economy. Geographically, the distribution of poultry farming is uneven, exhibiting a significant concentration in specific regions. Tehsils such as Sangamner home to over 3 million birds across 1,035 farms contribute more than 21% to the district's total bird population. These are followed by the Parner approximately 15.3% and Nagar tehsils collectively these tehsil constitute major poultry farming clusters and account for a share of over 40% of the total bird population. These regions benefit from excellent infrastructure, proximity to markets, and well established business networks [(14)]. Conversely, poultry farming activity appears to be extremely limited in Jamkhed and certain other tehsils. This scenario highlights developmental disparities, which are influenced by factors such as the availability of poultry feed, water supply, transportation facilities, and the adoption of entrepreneurial initiatives. Human resources are crucial for the growth of any business. Among human resources, certain key factors hold the utmost importance: an individual's skills, education, and knowledge, as well as the manner in which they utilize various tools. All these elements collectively impact their diverse professional endeavours [(4,11,14)] . The growth of the poultry sector in Ahilyanagar aligns with broader trends observed across the entire state of Maharashtra. Despite challenges such as droughts and land scarcity in Maharashtra, several districts have witnessed consistent growth in the livestock sector which includes poultry farming. Often adopted as an integrated farming alternative alongside crop cultivation and dairy farming, poultry farming enhances agricultural resilience, generates employment, and contributes significantly to nutritional security. The objective of this geographical study of the poultry business in Ahilyanagar district is to examine its spatial characteristics, the disparities across various tehsils, the environmental and socio-economic factors influencing it, and its potential for sustainable development. By analysing the dynamics and patterns of the industry's distribution, this study endeavours to provide the in-depth insights and direction necessary for targeted interventions, policy support, and balanced development within the region. Geographically, the distribution of the poultry industry is not uniform across the region; rather, it exhibits significant spatial concentration in specific locations. This pattern of distribution has emerged due to disparities in resource availability such as animal feed, veterinary services, and transport infrastructure as well as proximity to major markets particularly those in Pune, Mumbai, and Nashik, coupled with variations in farmer initiative and investment levels. Sangamner tehsil stands as the undisputed leader in this sector, boasting over 1,035 poultry units and a bird population exceeding 3.04 million; this figure accounts for approximately 21% of the district's total bird population. Through this, Sangamner tehsil has firmly established itself as a major commercial hub for poultry farming. It is followed by Parner tehsil according to some estimates this tehsils houses over 2 million birds, contributing approximately 15% to 16% to the total business volume. Nagar tehsil ranks next; collectively, these three tehsils form a robust cluster in the north central part of the district, contributing significantly to the total production output. Tehsils such as Kopargaon, Rahata, Shrigonda, Pathardi, and Rahuri host medium scale poultry operations, which are often bolstered by robust irrigation facilities or efficient transport networks. Conversely, tehsils like Jamkhed, Shevgaon, and certain parts of the southern district exhibit extremely low participation in poultry farming; the primary reasons for this include severe drought conditions, a lack of infrastructure, and the slow adoption of modern and intensive farming methods.

Study area:

Ahilyanagar district has been selected for a present research study. The district is first in the sense of geographical area (17048 sq. km.) in the state of Maharashtra. It is situated between 18° 20′ and 19° 59′ north latitudes and 73° 40′ to 75° 43′ east longitudes (Map.1) administratively; Ahilyanagar district consists of fourteen tehsils. This study region is divided into there are three physical divisions namely, first Sahyadri mountain ranges, the second Plateau and the third plains area. The average annual rainfall is 566 mm. and means daily maximum temperature is 39°C and the mean daily minimum temperature is 11° C. The population of the Ahilyanagar district according to the 2011cesus is 4543159 with about 51.57% as male and 48.43 % as female population. The density of the population was 266 persons per sq. km

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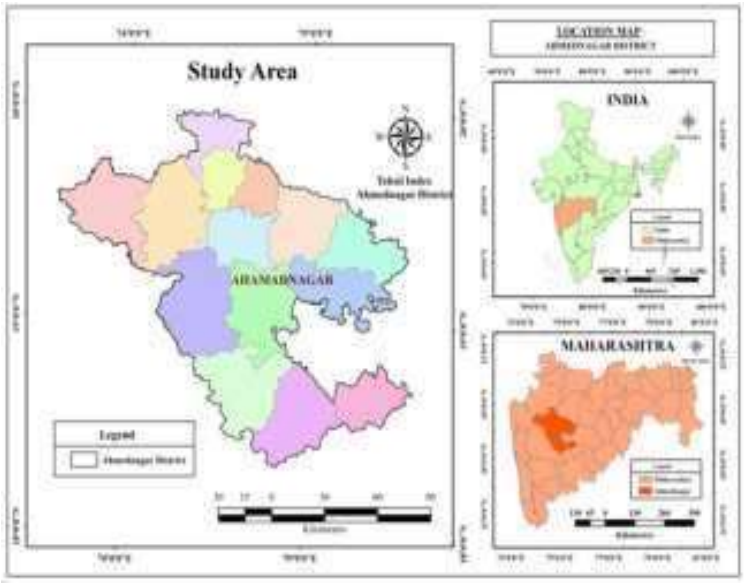

Map no 01: Location Map

Aims and objective: The primary objective of this research is to conduct a geographical study of poultry farming in the Ahilyanagar district, and alongside this, to examine the challenges associated with this industry.

Research Methodology:

To achieve the primary objective of the present study, the research methodology employed is predominantly secondary in data sources. In short, the data pertaining to the said poultry farm is of a secondary data. The data pertaining to this poultry farm covers the period 2024–25 year. This data has been secondary sourced from the District statistical department of Ahilyanagar. Furthermore, during the preparation of the research paper, chromatography was employed to convert the quantitative data into qualitative data; specifically, a bar graph was generated for this purpose. The challenges facing the poultry industry, as addressed in this study, have been identified and formulated with the aid of various research papers to facilitate a comparative analysis; this research has been conducted from a theoretical perspective.

Result and Discussion:

The poultry farming sector in the Ahilyanagar district of Maharashtra has achieved robust commercial growth. According to 2024–2025 statistics, approximately 4,282 poultry centers (farms) are operational across the district's 14 tehsils, collectively rearing a total of approximately 14.35 million (14,352,090) birds. Of these, the rearing of 'Broiler' chickens primarily focused on meat production accounts for the largest share, standing at approximately 79% this translates to 11.32 million birds being reared across 3,578 centers. Conversely the rearing of 'Layer' chickens undertaken for egg production accounts for a 21% share, comprising 3.03 million birds across 704 centers. However, the geographical distribution of these enterprises is uneven. A significantly higher concentration of this business is observed in the tehsils located in the north central part of the district the primary reasons for this include excellent infrastructure, proximity to markets in Pune, Mumbai, and Nashik, as well as an established distribution network for the supply of poultry feed. In contrast, activity within this sector remains limited in the district's peripheral border tehsil a situation primarily attributed to factors such as droughts and a scarcity of resources.

Table no 01: Total No. of Farms and Total No. of Birds (2024-25)

Sr. No.	Tehsils	Total No. of Farms	Total No. of Birds
1.	Akole	224	566,766
2.	Jamkhed	57	172,390
3.	Karjat	190	533,438
4.	Kopargaon	454	1,231,714
5.	Nagar	375	1,629,938
6.	Newasa	147	564,303
7.	Parner	639	2,204,123
8.	Pathardi	114	952,186
9.	Rahata	295	674,355

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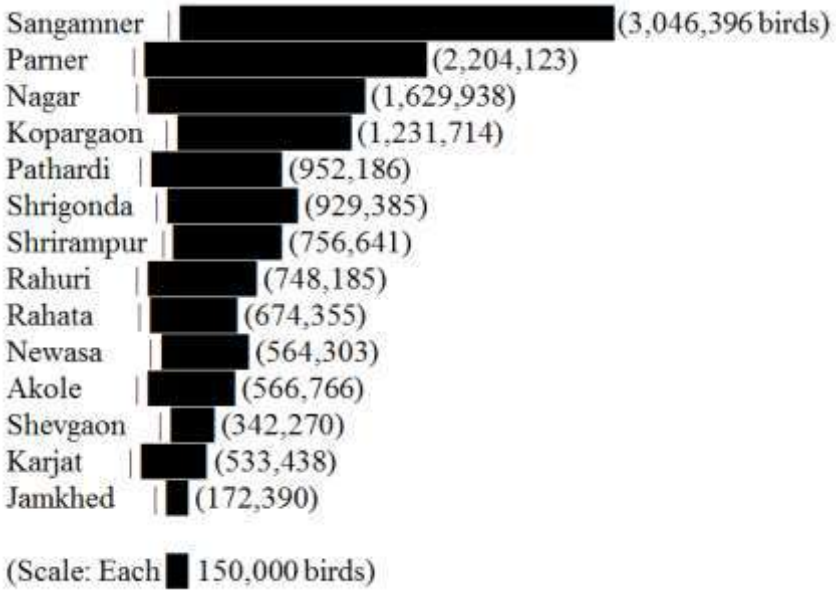
10.	Rahuri	169	748,185
11.	Sangamner	1,035	3,046,396
12.	Shevgaon	169	342,270
13.	Shrigonda	239	929,385
14.	Shrirampur	175	756,641
Total	**Ahilyanagar District**	**4,282**	**14,352,090**

S**angamner** leads as the major hub 21% of district birds, highest farms and birds. **Parner** and **Nagar** follow closely, forming the core commercial cluster > 40% combined share. **Jamkhed** has the lowest activity, typical of scarcity zones.

Graph no 01: Bar Chart: Number of Poultry Birds by Tahsil (Descending Order)



Challenges in poultry farming:

Although poultry farming is a rapidly growing and economically significant sector in India as well as in districts like Ahilyanagar in Maharashtra it faces numerous challenges that impact its productivity, profitability, and sustainability. These obstacles stem from the combined effects of environmental, biological, economic, infrastructural, and managerial factors, and they often become particularly acute in semi-arid regions that are vulnerable to climate change.

1. Disease outbreaks constitute one of the most serious and frequently recurring threats. Chickens are highly susceptible to Newcastle disease, Avian Influenza Bird Flu, and various other viral and bacterial infections; this leads to increased mortality rates, the mass culling of birds, and significant economic losses. In Maharashtra including the Ahilyanagar region recent Bird Flu outbreaks resulted in the culling of thousands of chickens and the destruction of eggs, particularly within backyard and unorganized farming operations. However, organized commercial farms remain in a relatively better position due to strict biosecurity measures. Disease control is further complicated by the limited availability of vaccines, stringent regulations regarding certain vaccines, inadequate veterinary services in remote areas, and challenges associated with timely diagnosis and response.
2. Volatility in animal feed prices constitutes a major economic hurdle. Poultry feed which is primarily composed of maize and soybean meal accounts for 60% to 70% of production costs. Sharp fluctuations in raw material prices driven by market dynamics, the diversion of maize for ethanol production, reliance on imports, and crops vulnerable to adverse weather conditions directly inflate costs and erode farmers' profit margins. In price sensitive markets like India, rising feed costs often lead to a reduction in flock sizes, delays in restocking, or even farm closures as evidenced by the recent decline in the number of commercial poultry farms in Maharashtra.
3. In rain-shadow regions such as Ahilyanagar, specific challenges arise due to climatic and environmental constraints. In these areas, annual rainfall is low and erratic typically ranging between 560 and 600 mm and the region is frequently plagued by prolonged

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droughts and acute water scarcity. The scorching heat experienced during the summer months leads to a decline in livestock feed intake, slows down egg production and growth rates, and results in increased mortality rates; furthermore, this necessitates substantial investment in cooling systems or environmentally controlled housing an expenditure that many small and medium-scale farmers cannot afford. Water scarcity further complicates this situation, particularly with regard to the provision of drinking water, sanitation, and cooling systems.

4. Market volatility and price fluctuations create uncertainty for producers. Demand undergoes seasonal shifts influenced by festivals, cultural factors, and consumer preferences; conversely, an excess supply of goods or a sudden decline in demand e.g., due to fears of disease outbreaks causes the prices of broiler chickens or eggs to plummet rapidly. Weak market linkages, coupled with a lack of cold storage facilities, processing centers, and transportation infrastructure, exacerbate post-harvest losses, diminish farmers' bargaining power, and pose significant challenges in reaching distant urban markets such as Pune, Mumbai, or Nashik.
5. Constraints related to infrastructure and the basic inputs essential for production create impediments to development; this issue is particularly acute in the less-developed tehsils of Ahilyanagar district e.g., Jamkhed, Shevgaon. These limitations include an erratic power supply which adversely affects ventilation and lighting systems, as well as the limited availability of quality chicks, veterinary medicines, skilled labor, and credit facilities. Farmers operating on a small or household scale often lack training regarding modern techniques, biosecurity protocols, or scientific management practices; consequently, their productivity remains low, and the risks they face are heightened.
6. Other notable challenges include rising labour costs and labour shortages petty theft and pilferage within extensive operational systems; regulatory complexities such as restrictions on specific schemes or concerns regarding antibiotic usage and emerging issues such as growing consumer awareness regarding food safety, antibiotic residues, and animal welfare.

In the Ahilyanagar district, these challenges manifest geographically, centralized commercial hubs like Sangamner and Parner benefit from excellent infrastructure and market accessibility, whereas, conversely, underdeveloped tehsils face more severe consequences due to aridity, a lack of connectivity, and low investment. As a remedy and to ensure the sustainable and equitable development of the poultry sector an integrated approach is essential; this includes measures such as strengthening biosecurity and veterinary extension services; promoting feed alternatives and price stabilization mechanisms; investing in climate-resilient infrastructure; enhancing market linkages; and providing targeted training and credit facilities.

Conclusion:

In the Ahilyanagar district of Maharashtra, the poultry sector supports over 4,280 farms and approximately 14.3 million birds of which 79% are of the 'broiler' variety. In this semi-arid and drought-prone region characterized by low and erratic annual rainfall ranging between 560 and 600 mm poultry farming has emerged as a primary source of income. Climate related risks including extreme heat, prolonged dry spells, and water scarcity adversely affect bird performance, increase mortality rates, and consequently, make the installation of expensive cooling and ventilation systems mandatory. This disproportionately impacts small-scale farmers in tehsils such as Jamkhed and Shevgaon. Fluctuations in feed prices driven by rising costs of maize and soybean, the diversion of crops for ethanol production, and supply chain disruptions create instability in feed-related expenses; these costs typically account for 60 to 70 percentage of total operational expenditure. Consequently, profit margins shrink, bird populations decline, and in recent times, the overall growth trajectory of commercial poultry farming in Maharashtra has been observed to slow down. The threat of diseases particularly outbreaks of epidemics such as Newcastle disease and Avian Influenza (Bird Flu) results in significant financial losses. This situation is further exacerbated by lapses in biosecurity protocols, limited availability of veterinary services, and a shortage of vaccines in remote areas. Due to regional disparities, poultry production is observed to be primarily concentrated in major hubs such as Sangamner, Parner, and Nagar. These centers benefit from excellent infrastructure, as well as strong market linkages with cities like Pune, Mumbai, and Nashik. Conversely, outlying tehsils lag behind in terms of development due to a lack of connectivity and limited availability of resources. Additional challenges such as market price volatility, inadequate storage and processing facilities, labour shortages, unreliable power supply, limited access to credit and training, and issues regarding the availability of essential agricultural inputs are

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hindering the progress of small and marginal farmers.

Acknowledgment

I would like to express my sincere gratitude to all those who have contributed to the successful completion of this study on *"Challenges of Poultry Farming in the Ahilyanagar District of Maharashtra, India."*

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their continuous guidance, valuable suggestions, and encouragement throughout the course of this work. Their support has been instrumental in shaping this study.

I am also deeply thankful to the farmers and poultry farm owners of Ahilyanagar district who generously shared their experiences, insights, and practical knowledge. Their cooperation has been invaluable in understanding the real challenges faced in the poultry sector.

I express my sincere appreciation to the officials and staff of agricultural and veterinary departments for providing necessary data, information, and support during the research.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

The Interplay Between Higher Education, Innovation and Start-Up Ecosystem in India

Ritanjali Swain
Dr. Babasaheb Ambedkar Commerce & M.V.R. Shinde Arts College

Manuscript ID:
BN-2026-030323

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 107-109

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840381
DOI link:
https://doi.org/10.5281/zenodo.20840381

Abstract

The connection between higher education, innovation and entrepreneurship has become increasingly important in modern economies. India's growing startup environment has been strongly influenced by universities, research institutions and supportive government policies. Higher education institutions are now contributing not only through teaching but also through research, skill development and the promotion of entrepreneurial thinking among students. Innovation laboratories, incubation centres and startup mentoring programmes within universities provide a platform where new ideas can be developed and converted into viable businesses. This study examines the relationship between higher education institutions, innovation systems and the startup ecosystem in India. The research relies on secondary data gathered from journals, reports, policy documents and academic publications. The analysis highlights that universities play a major role in knowledge creation, technology development and talent generation, all of which support the formation of startups. Government initiatives such as Startup India and the Atal Innovation Mission have further encouraged students and researchers to engage in entrepreneurial activities. However, the study also identifies challenges such as limited research funding, gaps in industry–academia collaboration and difficulties in commercialising academic research. The findings suggest that stronger partnerships among universities, industries, investors and policymakers are essential to strengthen the innovation ecosystem. The paper concludes that integrating entrepreneurship education, improving research infrastructure and encouraging collaborative innovation can significantly enhance the startup ecosystem in India.

Keywords: *Higher Education, Innovation, Startup Ecosystem, Entrepreneurship, India, Incubation Centres*

Introduction

In a knowledge-based global economy, innovation and entrepreneurship are key factors that drive economic development and competitiveness. Nations increasingly rely on higher education institutions to generate knowledge, develop skilled human resources and support technological advancement. Universities are no longer limited to classroom teaching; they have become active contributors to innovation systems and startup development. India has one of the largest higher education systems in the world and has also emerged as one of the fastest growing startup ecosystems. The rise of digital technology, government support and increased access to funding have encouraged young entrepreneurs to launch innovative ventures. Many universities have established incubation centres and innovation hubs to nurture student ideas and transform them into entrepreneurial projects. Through mentorship, infrastructure and networking opportunities, these institutions play an important role in building a strong startup culture. Understanding how higher education interacts with innovation and entrepreneurship is therefore essential for strengthening India's economic and technological progress.

Problem Statement

Despite the rapid expansion of higher education and the growth of startups in India, a gap still exists between academic research and its commercial application. Many institutions focus mainly on theoretical learning, while limited collaboration with industries reduces opportunities for innovation-driven entrepreneurship.

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Address for correspondence:
Ritanjali Swain, Dr. Babasaheb Ambedkar Commerce & M.V.R. Shinde Arts College
Email: ritu.swain1980@gmail.com

How to cite this article:
Swain, R. (2026). The Interplay Between Higher Education, Innovation and Start-Up Ecosystem in India. Bulletin of Nexus Journal, 3(3(II)), 107–109. https://doi.org/10.5281/zenodo.20840381

Quick Response Code:

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This study explores how higher education can more effectively contribute to the startup ecosystem and what barriers currently limit this interaction.

Objectives of the Study

1. To examine the role of higher education institutions in encouraging innovation.
2. To understand the relationship between innovation and the startup ecosystem in India.
3. To study how universities contribute to entrepreneurship and startup development.
4. To identify major challenges affecting the innovation ecosystem.
5. To suggest measures to strengthen collaboration between academia and industry.

Scope of the Study

The study focuses on the role of Indian higher education institutions in supporting innovation and entrepreneurship. It examines initiatives that promote research, startup incubation and skill development within universities. The research is limited to India and relies mainly on published secondary sources.

Limitations of the Study

1. The research is based on secondary data from published reports and academic sources.
2. The study does not include primary data such as interviews or surveys.
3. The analysis focuses only on the Indian context.
4. Time constraints limited deeper empirical investigation.

Data Collection

Secondary data were collected from academic journals, government publications, policy reports, startup ecosystem studies and credible online resources. These sources provided information regarding innovation initiatives, startup growth and the role of universities in entrepreneurship.

Research Methodology

The research follows a descriptive and analytical approach. Existing literature on innovation, higher education and entrepreneurship was reviewed to understand the interaction among these factors. The collected data were analysed to identify trends, opportunities and challenges related to the development of the startup ecosystem in India.

Statistics Used

Descriptive statistics and qualitative interpretation were used in the study. Various national reports indicate that India hosts a rapidly expanding number of startups and incubation centres. Major startup clusters are located in cities such as Bengaluru, Delhi-NCR, Mumbai, Hyderabad and Pune, where universities and technology institutes contribute significantly to innovation.

Results and Discussion

The analysis indicates that higher education institutions are key contributors to the growth of the startup ecosystem. Universities provide a supportive environment where students and researchers can develop new ideas and transform them into practical innovations. Incubation centres established within campuses offer mentorship, infrastructure and networking opportunities that help early-stage startups survive and grow. Government initiatives such as Startup India and Atal Innovation Mission have further strengthened this ecosystem by offering financial assistance and policy support. However, the research also shows that challenges remain. Many universities lack adequate research funding and modern infrastructure. Collaboration between academia and industry is still developing, which sometimes slows the commercialisation of research outcomes. Strengthening partnerships among educational institutions, businesses and investors can significantly improve innovation performance.

Conclusion

The study highlights the importance of higher education institutions in promoting innovation and entrepreneurship in India. Universities act as centres of knowledge creation, skill development and technological advancement. By encouraging research, innovation and startup activities, they contribute to economic growth and job creation. Although India's startup ecosystem has expanded rapidly, further improvements are required in research funding, industry collaboration and entrepreneurial training. Strengthening these areas will enable India to build a more sustainable and globally competitive innovation ecosystem.

Recommendations

1. Entrepreneurship education should be integrated into university curricula.
2. Government and private sectors should increase funding for research and innovation.
3. Stronger collaboration between universities and industries should be encouraged.
4. More incubation centres and innovation hubs should be established in universities.
5. Policies supporting technology transfer and commercialization of research should be strengthened.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *The Interplay Between Higher Education, Innovation and Start-Up Ecosystem in India*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable

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guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of the relationship between higher education, innovation, and the development of the start-up ecosystem in India.

I would also like to acknowledge the contributions of researchers, academicians, policymakers, and industry experts whose work on education, entrepreneurship, and innovation provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Finally, I am deeply grateful to my family for their unwavering support, patience, and motivation, which made the successful completion of this project possible.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Digital Marketing and Business Growth in India: Opportunities, Challenges and Future Prospects

Pawar Babasaheb Devram[1] Dr. Argade Sanjay Laxman[2]
[1]Prof Research Scholar Shri Gangageer Maharaj Science, Gautam Arts and Sanjivani Commerce College, Kopargaon, Maharashtra, India
[2]Prof.Research Guide K.J.S. College, Kopargaon, Maharashtra, India

Manuscript ID:
BN-2026-030324

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 110-112

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840421
DOI link:
https://doi.org/10.5281/zenodo.20840421

Abstract

Digital marketing has become a major influence, changing how businesses approach their strategies in today's digital world. As more people use the internet, smartphones, and social media, companies can now connect directly with customers and run their operations across different regions. This study looks at how digital marketing helps businesses grow and stay competitive in India. It explores important areas of digital marketing like social media campaigns, search engine optimization, online ads, and content creation. The research uses a descriptive approach and gathers information from government documents, industry articles, and academic papers. The results show that digital marketing boosts customer interaction, makes operations more efficient, and expands market reach, all while cutting down on advertising costs. Yet, there are still problems like a lack of digital skills, concerns about data privacy, and fierce online competition that make it hard for some businesses to adopt these strategies. The study says digital marketing will be key to India's digital future and long-term business success.

Keywords: *Digital Marketing, Business Growth, Social Media Marketing, SEO, Digital Economy, Online Advertising*

Introduction:

The way businesses operate has changed a lot because of digital technology. This shift has transformed how marketing is done around the world. Digital marketing uses the internet and digital tools to advertise products and services, and it helps build lasting connections with customers. In India, quick improvements in technology along with efforts to develop digital systems have made it easier for businesses and people to use digital tools. More people now have access to the internet and use mobile devices, which has allowed even small companies to take part in online markets. Compared to older marketing methods, digital marketing offers clear results, allows for better targeting of ads, and lets businesses interact with customers in real time. Because of this, it's now a key part of how companies stay competitive and grow in today's economy.

Review of Literature:

Earlier research shows that digital marketing is becoming more important for economic growth and business success. Kotler and Keller (2019) said that digital platforms make it possible to create personalized marketing plans and focus on customer needs. Chaffey (2020) found that using data analysis and online engagement greatly improves how effective marketing is. According to reports from the World Bank (2022), adopting digital tools increases productivity and creates more chances for entrepreneurs in developing countries. Studies from India show that using social media and online ads has helped small and medium businesses grow by cutting down on marketing costs and reaching more customers. However, some researchers have also pointed out issues like online security, customer trust, and the need for digital skills. This study looks at the Indian digital marketing environment and how it supports business growth and future economic progress.

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Address for correspondence:
Pawar Babasaheb Devram,Prof Research Scholar Shri Gangageer Maharaj Science, Gautam Arts and Sanjivani Commerce College, Kopargaon, Maharashtra, India
Email: babapawar11@gmail.com

How to cite this article:

Pawar, B. D. (2026). Digital Marketing and Business Growth in India: Opportunities, Challenges and Future Prospects. Bulletin of Nexus Journal, 3(3(II)), 110–112. https://doi.org/10.5281/zenodo.20840421

Quick Response Code:

Website: https://bnir.us

Objectives of the Study

1. To examine the concept and evolution of digital marketing in India.
2. To analyse the role of digital marketing in business growth.
3. To evaluate major digital marketing tools and platforms.
4. To identify challenges affecting digital marketing adoption.
5. To suggest strategies for sustainable digital marketing development.

Research Methodology

The study uses a descriptive and analytical approach.

Data Source:

Secondary data was gathered from:

1. Reports by the Government of India
2. Publications by the World Bank
3. Reports from the Reserve Bank of India and digital economy studies
4. Academic journals and research papers

Method of Analysis:

The analysis involves qualitative methods and comparing existing research with statistical trends.

Scope of Study:

The research looks at how Indian businesses, especially small and medium enterprises, are adopting digital marketing.

Growth of Digital Marketing in India

Digital marketing in India has expanded quickly because of various technological and social economic factors.

These include:

1. More people having access to the internet
2. Affordable smartphones
3. Growth of online shopping websites
4. Development of digital payment methods
5. Expansion of social media platforms

More and more businesses are spending their marketing budgets on digital platforms because they can easily measure how well their campaigns are performing and can target specific customers.

Major Digital Marketing Tools

1 Social Media Marketing

Social media platforms help businesses build their brand and keep customers engaged through active interaction.

2 Search Engine Optimization (SEO)

SEO helps websites appear higher in search results and brings in more visitors naturally, making marketing more effective in the long term.

3 Content Marketing

Creating good quality content helps build trust and credibility for a brand.

4 Email Marketing

Email is useful for keeping customers interested and sending personalized messages.

5 Online Advertising

Paid digital ads offer quick visibility and help promote products or services to the right audience.

Impact on Business Growth

Digital marketing helps businesses grow in the following ways:

- Reaching a wider audience
- Cutting down on marketing expenses
- Building better connections with customers
- Making decisions based on data
- Improving how the brand is positioned

Smaller businesses especially benefit as digital tools help them enter competitive markets without high initial costs.

Challenges in Digital Marketing

Even though digital marketing is growing fast, there are still several problems:

- Lack of digital skills among some people
- Concerns about how personal data is used
- Risks related to cyber security
- Reliance on search engine algorithms
- Increasing competition online

Solving these issues is important for digital marketing to continue growing sustainably.

Findings and Discussion

The study shows that digital marketing has become a necessary part of business strategy and not just an extra promotional activity.

Companies that use a full range of digital tools tend to get more customers and keep them longer. Government programs and better internet access have helped more businesses use digital marketing; however, developing skills and creating strong rules are important for long-term success.

Conclusion

Digital marketing has changed how businesses work by making communication more efficient, opening up new markets, and providing clear results. In India, digital marketing supports entrepreneurs, innovation, and the growth of the economy. Future progress will depend on improving understanding of digital tools, making cyber security stronger, and promoting the responsible use of data. Digital marketing will continue to be a major force in helping India move towards a more knowledge-based and digitally advanced economy.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Digital Marketing and Business Growth in India: Opportunities, Challenges and Future Prospects*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my

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understanding of digital marketing strategies and their impact on business growth in India.
I would also like to acknowledge the contributions of researchers, industry experts, and scholars whose work on digital marketing, consumer behavior, and business development provided a strong foundation for this study.
My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Transition of Consumer Preference from Conventional to Organic Food Products with special reference to Satara and Karad City

Dr. Suvarna Ashok Kurkute
Associate Professor, Dhananjayrao Gadgil College of Commerce, Satara

Manuscript ID:
BN-2026-030325

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 113-116

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840473
DOI link:
https://doi.org/10.5281/zenodo.20840473

Abstract:

The paper focusses on transition of consumer preference from conventional to organic food products. Findings show that consumers of Satara city have used organic products in more number. A sample of 200 customers are selected wherein 100 customers are from Karad and Satara city each. Also, the researcher has studied the efforts taken by government in promoting organic products. Central Government through its various schemes and associations is supporting and motivating farmers to go for producing organic products, also the government through its network is trying to reach the customers and trying to create a market for organic food products. The researcher has suggested marketing strategies to make these products more popular among the customers and vendors too. Use of digital platforms, social media can also help popularise organic products.

Keywords: *Transition, Consumer Preference, Conventional, Organic Food Products*

Introduction:

Human beings survival on this earth depends upon existence of basic needs namely food, clothing, shelter, air, water, sleep etc. if these things are easily available then life of humans become more stable. Abraham Maslow who discussed five needs and their hierarchy in the form of Need Hierarchy Theory has mentioned basic needs as the lower order and first level need in the hierarchy of needs. During ancient period the quality of food was good as compared to today. As far as food grains, cereals etc. are considered, less amount of or no insecticides and pesticides were used due to less advancement in science. But as the developments in science grew and humans became more educated they learnt new techniques of protecting the crops by making heavy use of insecticides and pesticides. Also liberalization, privatization and globalization (LPG) brought about drastic changes in the crop pattern and the techniques used to protect the crops. Due to this market was flooded with fresh vegetables , fruits and hybrid varieties of crops. The exterior of fruits looked fresh , free from insects but has lost the required nutrients necessary for human body. This change brought about many health issues and diseases increased over the period. This was the phase where organic products peeped into the market, as many doctors and entire medical field started talking about heavy use of pesticides and fertilizers which is hampering the health of humans. So many producers diverted their attention to organic food and minimum use of heavy chemicals or zero use. This brought about a trend or a revolution in the market leading to more demand for organic food products.

Review of Literature:

1. A Study on Impact of Organic Foods on Human Health Rahul Desai Garima Malik(2021) : The researchers in their research article has made an effort to study the impact of organic foods on human health, they have also discussed about the health benefits especially to fight COVID – 19. Their entire attention lies on importance of organic food products on human health. In addition they have studied the significance of organic farming and his vital role in nutritional diet.
2. Organic food and impact on human health: Assessing the status quo and prospects of research M. Huber, E. Rembiałkowska, D. Średnicka, S. Bügel & L.P.L. van de Vijver (2021):

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Address for correspondence:
Dr. Suvarna Ashok Kurkute, Associate Professor, Dhananjayrao Gadgil College of Commerce, Satara

How to cite this article:

Kurkute, S. A. (2026). Transition of Consumer Preference from Conventional to Organic Food Products with special reference to Satara and Karad City. Bulletin of Nexus Journal, 3(3(II)), 113–116. https://doi.org/10.5281/zenodo.20840473

Quick Response Code:

Website: https://bnir.us

In this article researchers have investigated the nutritional value present in organic products. They have tried to compare the nutritional value and health effects.

3. Organic Food Products: A Study On Perception of Indian Consumers Dr. N. Savithri, Lavanya(2019): This study is based on consumers perception towards organic products and their inclination towars buying those products.

Research gap: Reviews shows that researchers have focussed attention on health aspect while this study undertake the transition preference of customers which is the untouched area.

Objectives of the Study:

1. To test the association between city and consumer preference.
2. To suggest the marketing strategies to promote organic food products.
3. To study the efforts taken by Government to promote organic products.

Hypothesis of the Study:

- **H_0 (Null Hypothesis):**
  There is no significant difference in consumer preference between Satara and Karad.
- **H_1 (Alternative Hypothesis):**
  There is a significant difference in consumer preference between the two cities.

Research Methodology: The researcher is interested in analytical study of the said subject and related data is collected in the following manner.

Survey Method: In order to elicit relevant information the survey method was adopted. The sampled units were visited and their responses were collected through a comprehensive structured interview schedule. The respondents include customers of Satara and Karad City.

Sample size and sampling technique: In all 200 customers are selected from both the cities (100 each city) and purposive sampling technique is used.

Data Analysis:

This study aims to examine whether there is a significant shift in consumer preference from conventional to organic food products and whether this transition differs between the two cities.

A Chi-square test of independence is applied to determine whether:

- Consumer preference is independent of city, or
- There exists a significant association between location and food preference

A total of 200 respondents were surveyed:

- 100 from Satara
- 100 from Karad

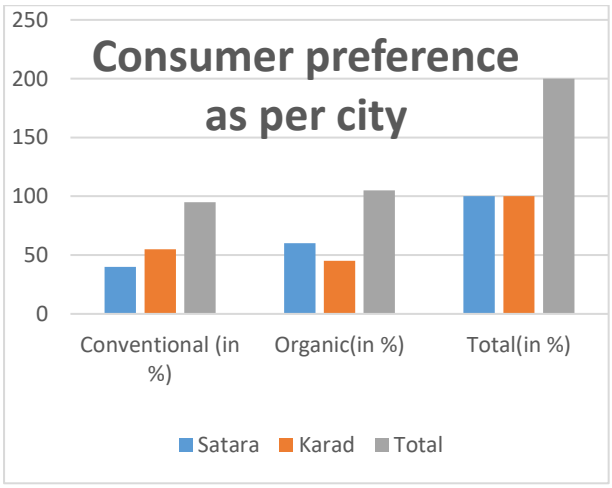
Respondents were classified into:

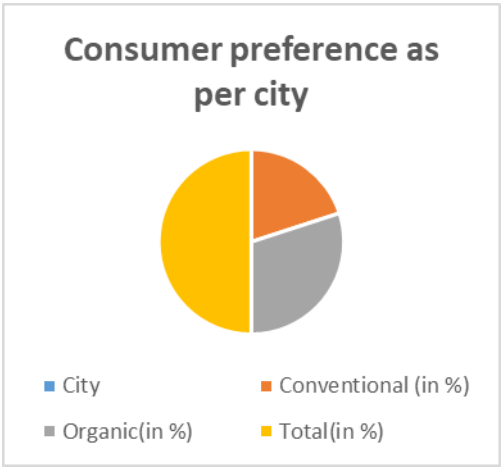
- Preference for Conventional Food
- Preference for Organic Food

Table No. 1 Consumer preference as per city

Sr.No.	City	Conventional (in %)	Organic(in %)	Total(in %)
1	Satara	40	60	100
2	Karad	55	45	100
	Total	**95**	**105**	**200**

Source: Compiled by researcher





As seen in the above bar diagram percentage of consumers consuming organic products is more , while consumers from karad city prefer conventional over organic products. The same data if seen in pie chart shows preference for organic products over conventional. The reason include

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high awareness about organic products among Satara city, its lifestyle and easy avaliability of organic products. As far as Karad city consumers are concerned, they are less aware of healthy food products and as organic products are costlier they prefer to stay away from them.

Results:

Sr.No.	Test	Value	Degree of freedom(df)	Asymp.Sig. (2 – sided)
1.	Pearson Chi- Square	4.51	1	0.034
2.	Continuity Correction	3.89	1	0.048
3.	Likelihood Ratio	4.53	1	0.033
4.	N of Valid Cases	200		

Statistical Interpretation:

- The **Pearson Chi-square value (χ^2) = 4.51**
- Degrees of freedom (df) = 1
- **p-value = 0.034**

Since **$p < 0.05$**, the result is statistically significant.
Therefore, the null hypothesis (H_0) is rejected.
This result indicates that:

- Consumer preference is not independent of location
- There is a significant relationship between city and food preference

Government Initiatives:

Indian Government has also taken concrete steps to increase the sale and preference of customers towards organic products.Key government entities supporting organic products in India include the **APEDA** (Ministry of Commerce), which manages NPOP certification, and the National Centre for Organic and Natural Farming (NCOF) under the Ministry of Agriculture. FSSAI regulates safety standards via the Jaivik Bharat portal, while schemes like Paramparagat Krishi Vikas Yojana (PKVY) encourage farming.

Key Government Entities and Organizations:

- APEDA (Agricultural and Processed Food Products Export Development Authority)**:** Oversees the National Programme for Organic Production (NPOP), which is the main certification system for organic exports and products in India.
- **NCOF (National Centre for Organic and Natural Farming):** A nodal agency under the Ministry of Agriculture and Farmers Welfare responsible for implementing national projects on organic farming and providing training, operating under the National Mission on Sustainable Agriculture (NMSA).
- **FSSAI (Food Safety and Standards Authority of India):** Sets safety standards for organic foods, regulates labelling, and manages the Jaivik Bharat portal to ensure integrity and compliance with FSSAI (Organic Foods) Regulations.
- **PGS-India (Participatory Guarantee System):** A government-supported certification system aimed at small, local producers based on participatory trust, often preferred for domestic markets over expensive third-party certifications.
- **State Governments:** Various state governments have dedicated policies, notably Sikkim, which was recognized as the first 100% organic state.

Findings and Suggestions:

- In Satara, a majority (60%) prefer organic food
- In Karad, a majority (55%) still prefer conventional food
  This clearly shows that there is faster transition toward organic consumption in Satara as compared to Karad.
- Consumers in Satara seem to be more educated and inclined towards organic foods.
- Consumers from Karad are still stuck to conventional food.
- City and food preference do have a relationship.

Researcher would like to suggest a few things which includes-

- More awareness and campaigning in Karad.
- Price promotion and trials may make the change in the mindset of people.
- Organic products should be made available easily and at affordable prices.
- Social media can prove to be boon for spread of the information to masses.
- Fairs and exhibitions can also be one of the way to tackle the problem.

Conclusion:

Though many people prefer organic foods over conventional, but the fact lies over here that still consumer awareness plays an important role in transition. Despite of many efforts taken by the government and the number of schemes declared for the same, still the constraints like high price of organic products is one of the major reason for neglecting organic products. Also the mentality , educational level and the amount of trust in the minds of people still are the significant factors for slow transition.

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Acknowledgement
I would like to express my sincere gratitude to all those who have supported and guided me in the successful completion of this research study on the transition of consumer preference from conventional to organic food products with special reference to Satara and Karad City.
First and foremost, I extend my heartfelt thanks to my project guide for their valuable guidance, continuous encouragement, and insightful suggestions throughout the course of this study. Their support has been instrumental in shaping this research work.
I am also thankful to my institution and faculty members for providing me with the necessary resources and academic environment to carry out this research effectively.
I would like to express my appreciation to all the respondents from Satara and Karad who willingly participated in the survey and provided valuable information. Their responses have significantly contributed to the success of this study.
I am grateful to my family and friends for their constant support, motivation, and encouragement during the entire research process.

Financial support and sponsorship
Nil.

Conflicts of interest
The authors declare that there are no conflicts of interest regarding the publication of this paper

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4. Research Methodology – C.R.Kothari
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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

To Study on Strategic Leadership

Kaveri[1] Sachin Jadhav[2]
[1]Dr Dy Patil Arts Commerce and Science Womens College Pimpri Pune
[2]Head department of commerce at Dr Dy Patil Arts Commerce and science womens college

Manuscript ID:
BN-2026-030326

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 117-121

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840500
DOI link:
https://doi.org/10.5281/zenodo.20840500

Abstract

his study explores the impact of strategic leadership on enhancing organizational performance by analyzing key leadership practices, decision-making approaches, and the alignment of leadership strategies with organizational goals. Strategic leadership focuses on creating a long-term vision, driving organizational change, and aligning resources for competitive advantage. Core keywords for study include. It requires balancing immediate needs with future goals.

Keywords: *strategic planning, visionary thinking, decision-making, change management, systems thinking*

Introduction

Strategic leadership is the specialized ability of senior executives and managers to anticipate, envision, and maintain flexibility while empowering others to create strategic change for a shared future. It bridges the gap between today's operational execution and tomorrow's long-term aspirations.

Core Definitions

- A Future-Focused Mindset: Strategic leadership involves setting a long-term vision and making decisions that ensure an organization remains competitive in a changing economic and technological climate.
- Balance of Dimensions: It requires balancing a focused analytical perspective (data-driven strategy) with the human dimension (inspiring and aligning people).
- Sustainable Advantage: Its primary objective is to achieve sustainable competitive advantage, ensuring the enduring success of the organization.

The Strategy Stack (Layers of Leadership)

In most organizations, strategy and leadership are applied at three distinct levels:

- Corporate Strategy: Formulated by the CEO and Board; they determine the broad playgrounds where the company will compete.
- Business Strategy: Managed by unit heads; they focus on how to specifically win in those chosen markets.
- Functional Units: Departments like marketing or engineering; they align their daily operations to support the larger business goals.

Essential Keywords for Students

- Anticipate: Collecting information from diverse sources to predict competitor moves.
- Alignment: Ensuring that all teams, resources, and budgets are pulling in the same direction toward a shared goal.
- Agility/Adaptability: The capacity to pivot quickly in response to market shifts or technological disruptions.
- Influence without Authority: The ability to convince and align stakeholders who do not directly report to you.
- VUCA: An acronym for the environment strategic leaders operate in: Volatile, Uncertain, Complex, and Ambiguous.

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Address for correspondence:
Kaveri, Dr. Dy Patil Arts Commerce and Science Womens College Pimpri Pune

How to cite this article:
Kaveri, & Jadhav, S. (2026). To Study on Strategic Leadership. Bulletin of Nexus Journal, 3(3(II)), 117–121. https://doi.org/10.5281/zenodo.20840500

Quick Response Code:

Website: https://bnir.us

Objective study

The overarching goal is to transform "traditional" managers into future-fit leaders who can drive sustainable growth. Core objectives include:

- Mastering Strategic Thinking: Learning to "zoom out" to see the big picture—including market trends and competitor moves—before "zooming in" on execution.
- Aligning Teams and Resources: Gaining the skills to ensure every department, budget, and individual effort pulls toward the same unified goal.
- Leading Through Uncertainty: Developing frameworks to make high-stakes decisions even when data is incomplete or the environment is volatile (VUCA).
- Driving Change and Innovation: Understanding how to overcome resistance to change and foster a culture where creativity is a primary tool for survival.
- Influencing Without Authority: Learning to convince and align diverse stakeholders, such as board members or partners, over whom you may not have direct power.

Core Learning Outcomes (What You Will Gain)

By the end of your study, you should be able to:

1. Formulate Vision: Articulate a clear, compelling 3-5 year "North Star" for your organization.
2. Conduct Strategic Analysis: Use tools like SWOT or PESTLE to evaluate internal strengths and external threats.
3. Manage Stakeholders: Build coalitions and navigate organizational politics to gain buy-in for strategic plans.
4. Evaluate Performance: Establish Key Performance Indicators (KPIs) to measure whether strategic actions are delivering the intended financial or social impact.
5. Refine Personal Leadership: Develop higher Emotional Intelligence (EQ) to build trust and inspire resilience in your teams.

Primary Hypothesis

Academic studies often ground their primary hypotheses in established management theories:

- **Upper Echelons Theory:** Asserts that organizational outcomes (such as strategic choices and performance levels) are direct reflections of the values, experiences, and cognitive biases of the **Top Management Team (TMT)**.
- **Performance-Impact Hypothesis:** A core research premise that strategic leadership dimensions—specifically **strategic direction**, **operational efficiency**, and **employee focus**—have a statistically significant positive effect on "distinguished" or superior organizational performance.
- **Alignment Hypothesis:** Proposes that firms achieve higher competitiveness when leadership at the strategic level is tightly aligned with the organization's overarching objectives.

Common Research Variables

When building a hypothesis for a study on strategic leadership, researchers typically test the relationship between an **Independent Variable (IV)** and

- **Independent Variables (The Leader's Actions):** Establishing vision, developing human capital, sustaining core competencies, an

Research Methodology

Research methodologies in strategic leadership are designed to capture both the measurable impacts of top-level decisions and the complex human dynamics that drive them.

. Quantitative Research: The dominant strategy, often used to test causal relationships between leadership styles and financial performance or innovation. Researchers typically use large-scale surveys or secondary data from public companies.

- Qualitative Research: Used to explore "how" and "why" leaders make specific choices. This involves in-depth interviews, focus groups, or case studies to understand the lived experiences of executives.
- Mixed Methods: Combines both approaches to provide a "full picture"—for example, using a survey to find a trend and then interviews to explain the underlying reasons for that trend.
- Bibliometric & Temporal Analysis: A newer method used to map the evolution of the entire field by analyzing thousands of existing research papers to identify major themes and research gaps over decades.

2. Data Collection Techniques

- Surveys & Questionnaires: Standardized tools like the Path-Goal Questionnaire are used to measure specific leadership behaviors across many organizations.
- Semi-Structured Interviews: Allows researchers to probe deeply into an executive's mindset while maintaining enough structure to compare results across different leaders.
- Secondary Data Analysis: Examining annual reports, board meeting minutes, and financial statements to objectively track the results of strategic decisions.

3. Key Research Variables

- Upper Echelons Theory: Much of the research is built on the Upper Echelons Theory, which assumes that firm outcomes reflect the

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personalities and experiences of the top management team.

- Access to Elite Participants: A primary hurdle is the difficulty of securing time for interviews or surveys from high-level CEOs and Board members.
- Lag Time: There is often a significant delay between a leader's strategic action and its measurable result on organizational performance, requiring longitudinal studies.

Would you like to see a sample research proposal outline or a list of the top academic journals where this research is typically published?

3. Research questions / hypotheses

- How has the role of the Indian mutual fund industry evolved in mobilizing savings into equity/debt markets?
- What is the impact of digitalization on the growth and adoption of mutual funds in India?
- How do investors perceive the risk, return, and transparency of different mutual fund products?
- What is the role of fund managers in generating returns that outperform the market benchmark?
  (You can convert these into null hypotheses for statistical testing.)

Research design

Depending on your specific research question, you will likely choose one of the following:

- Descriptive Design: Focuses on "What is happening?" (e.g., *What are the most common strategic leadership traits in tech startups?*). It uses surveys to describe current states without necessarily proving cause-and-effect.
- Explanatory (Causal) Design: Focuses on "Why is it happening?" (e.g., *Does visionary leadership directly cause a 10% increase in market share?*). This typically uses statistical modeling to test hypotheses.
- Exploratory Design: Used when a topic is new (e.g., *How do strategic leaders manage AI-driven disruptions?*). This often relies on qualitative interviews to build new theories.

Research Instruments

If you are conducting a quantitative study, it is best to use pre-validated instruments rather than creating your own from scratch. This ensures your study has high reliability.

- Strategic Leadership Questionnaire (SLQ): Developed by Pisapia and colleagues, this measures three cognitive processes:
  - *Systems Thinking:* Seeing the big picture.
  - *Reframing:* Examining situations from multiple perspectives.
  - *Reflection:* Learning from past experiences.
- The Multifactor Leadership Questionnaire (MLQ 5X): Often used to measure "Transformational Leadership," which is a core component of strategic influence.
- Strategic Orientation Scale: Measures a leader's inclination toward proactiveness, risk-taking, and innovation.
- Likert Scales: Most instruments use a 5-point or 7-point scale (e.g., "1 = Strongly Disagree" to "5 = Strongly Agree").

Data Analysis Tools

Quantitative Analysis Tools (Statistical Software)

These tools are used to test hypotheses regarding the relationship between leadership traits and organizational performance.

- IBM SPSS Statistics: The most widely used tool in social science for its user-friendly interface and robust multivariate analysis capabilities.
- Stata: Favoured for econometric and panel data analysis, particularly when studying long-term strategic shifts in large datasets.
- R (RStudio): A free, open-source programming language that offers unmatched flexibility through thousands of specialized packages for predictive modeling and machine learning.
- JASP: A modern, open-source alternative that combines the power of R with a simpler interface, specifically designed for transparency in academic research.

Sample Size

Because you can't just ask anyone, you must use **Non-Probability Sampling**:

1. **Purposive Sampling:** Hand-picking participants who meet specific criteria (e.g., "Must have 10+ years of C-suite experience").
2. **Snowball Sampling:** Asking one CEO to refer you to another in their network.

Unit of Analysis vs. Sample Size

Be careful to distinguish between the two:

3. **Unit of Analysis:** The **Organization** (e.g., 50 companies).
4. **Sampling Framework-**

Target Population: Individual investors (retail), fund managers, and Asset Management Companies (AMCs) in India.

- **Sampling Unit:** Individual investors (for primary data) and specific mutual fund schemes (for secondary data).
- **Sampling Method:**
  - **Convenience/Purposive Sampling:** Often used for surveys, targeting investors in specific cities (e.g., Mumbai, Delhi, regional hubs).
  - **Judgment Sampling:** Used to select specific, high-performing, or representative schemes (e.g., top 10 equity funds).

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- **Sample Size:** Ranges from 50 to 100+ respondents for survey-based studies, often covering varied age and income groups

Hypothesis testing-

tudies on the Indian mutual fund industry highlight its rapid growth driven by increased individual income, financial literacy, and the crucial role of Asset Management Companies (AMCs) and intermediaries. Key research hypotheses focus on investor perception, risk appetite, and the influence of demographic factors on investment decisions. Research often utilizes tools like ANOVA and t-tests to evaluate these factors, confirming that, while trust is growing, product complexity and performance remain critical challenges.

Output-

The Indian mutual fund industry has experienced exponential growth, with Assets Under Management (AUM) surging from approximately ₹10 lakh crore in 2014 to over ₹80 lakh crore by late 2025. Driven by SIP inflows, retail participation, and digitalization, the industry plays a critical role in mobilizing household savings into capital markets. Private sector players dominate with a 75–80% market share.

Key Findings on Industry's Role & Growth:

- **Rapid Expansion:** The industry has seen a six-fold increase in AUM over the last decade, with a CAGR of over 22% between 2012 and 2023.
- **Market Concentration:** While there are 44+ Asset Management Companies (AMCs), the industry is heavily concentrated, with a small number of large players managing the majority of AUM.
- **Shift to Financial Assets:** The industry has facilitated a, structural shift from physical assets (gold, real estate) to financial instruments, particularly through Systematic Investment Plans (SIPs).
- **Market Penetration:** Mutual fund investors are now present in 100% of Indian districts, with unique investors growing from ~1 crore to over 5.6 crore in a decade.
- **Economic Impact:** The industry is crucial for capital formation, reducing reliance on foreign investors by boosting domestic institutional holdings.
- **Future Outlook:** The industry is projected to surpass ₹300 trillion in AUM by 2035, driven by younger investors and deeper penetration in smaller towns

Interoperation

In strategic leadership studies, **interpretation** is the process of applying meaning to raw data to assess its long-term impact on an organization's future. Unlike general management interpretation, which focuses on immediate efficiency, strategic interpretation evaluates how findings align with a 3-to-5-year vision and the organization's competitive survival.

1. The Core Focus of Interpretation

Interpretation in this field must bridge the gap between **what is happening** (data) and **why it matters for the future** (strategic intent).

- **Contextualization:** Strategic leaders do not just look at "the numbers." They apply "domain knowledge" to interpret data in the context of market shifts, competitor threats, and internal priorities.
- **Causality vs. Correlation:** A critical step is determining if a specific leadership behavior (e.g., high emotional intelligence) is actually causing a performance outcome or just appearing alongside it.

Key Research Interpretations on the Industry's Role:

One of the most critical interpretations in this field is that not all industries allow for the same level of strategic impact.

- High-Discretion Industries: In fast-moving sectors like Tech, Biotech, or Creative Media, the industry environment is volatile. Interpretation: In these sectors, the leader's personal vision and "guts" have a massive impact on firm performance.
- Low-Discretion Industries: In highly regulated or capital-intensive sectors like Utilities, Rail, or Oil & Gas, the industry structure dictates most moves. Interpretation: Here, the "leader" has less individual influence because the "industry rules" are so rigid.

2. The "Industry-Maturity" Interpretation

A key finding in strategic research is that the industry lifecycle determines the *type* of strategic leadership required:

- Emerging
  Industries: Require Entrepreneurial/Visionary l eadership to define new market categories.
- Mature/Declining
  Industries: Require Operational/Efficiency-driven strategic

Suggestion-

- Move beyond abstract ideas by applying standard industry tools:
- SWOT Analysis: Identify internal Strengths and Weaknesses alongside external Opportunities and Threats.
- 7Ps Framework: Analyse your market position and refine your competitive advantage.
- Vision Framing: Practice moving from vague goals to a concrete "3–5 year impact" statement that serves as a decision-making compass.

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Practical Study Activities

- Leadership is best developed through active experience:
- Keep a Leadership Journal: Record weekly reflections on how you led a specific moment or solved a problem to build self-awareness.
- Seek "Stretch" Assignments: Take on special projects that push you beyond your current technical capabilities to practice high-level problem-solving.
- Find a Strategic Mentor: Connect with experienced leaders to gain insights into their "discovery process" and how they handle complex trade-offs.
- Utilize Free Resources: Access free leadership courses from Harvard or MIT on edX, or follow high-level insights from Harvard Business Review and the Center for Creative Leadership.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *To Study on Strategic Leadership*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of strategic leadership and its importance in organizational success.

I would also like to acknowledge the contributions of researchers, scholars, and industry experts whose work on leadership, management strategies, and organizational behavior provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Finally, I am deeply grateful to my family for their unwavering support, patience, and motivation, which made the successful completion of this project possible.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Heavy Metal Pollution in Water: Sources, Toxicity and Remediation Techniques

Dr. Vishal A. Naik [1], Kajal R. Gaikwad [2], Mrugaya S. Thakur[3]
[1,2,3] Department of Chemistry, Mahatma Phule Arts, Science and Commerce College, Panvel, Navi Mumbai, MH-, India.

Manuscript ID: BN-2026-030327

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 122-126

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI: 10.5281/zenodo.20840554
DOI link: https://doi.org/10.5281/zenodo.20840554

Abstract

Heavy metal contamination of aquatic systems represents a critical global environmental challenge due to its persistence, non-biodegradability, toxicity, and bioaccumulative nature. Metals such as lead (Pb), mercury (Hg), cadmium (Cd), arsenic (As), and chromium (Cr) are introduced into water bodies through both natural processes and extensive anthropogenic activities including industrial discharge, mining, and agriculture. These contaminants pose severe risks to human health and aquatic ecosystems even at trace concentrations. This review provides a detailed and systematic discussion of the major sources of heavy metal pollution, their mechanisms of toxicity, and state-of-the-art remediation technologies. Conventional, advanced, and biological treatment approaches are critically evaluated in terms of efficiency, cost, and sustainability. Emphasis is placed on emerging hybrid and nanotechnology-based strategies as promising solutions for future water purification systems.

Keywords: *Heavy metals, Water pollution, Toxicity, Bioaccumulation, Remediation, Adsorption, Nanotechnology, Phytoremediation*



Graphical Abstract:

Introduction:

Heavy metal pollution in water has become a significant global environmental issue due to its persistence, non-biodegradability, and toxic nature [1]. Water, being a fundamental resource for human survival, agriculture, and industrial development, is increasingly being contaminated by hazardous substances, among which heavy metals are particularly dangerous [2]. Unlike organic pollutants that may degrade over time, heavy metals remain in the environment for prolonged periods and tend to accumulate in living organisms, leading to serious ecological and health consequences [3].

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Address for correspondence:
Kajal R. Gaikwad, Department of Chemistry, Mahatma Phule Arts, Science and Commerce College, Panvel, Navi Mumbai, MH-, India.
Email: gai.kajal988@gmai.com

How to cite this article:
Naik, V. A., Gaikwad, K. R., & Thakur, M. S. (2026). Heavy Metal Pollution in Water: Sources, Toxicity and Remediation Techniques. Bulletin of Nexus Journal, 3(3(II)), 122–126.
https://doi.org/10.5281/zenodo.20840554

Quick Response Code:

Website: https://bnir.us

Heavy metals are typically defined as elements with relatively high atomic weight and a density greater than 5 g/cm³ [4]. Common examples include lead (Pb), mercury (Hg), cadmium (Cd), arsenic (As), and chromium (Cr), all of which are known for their high toxicity even at low concentrations [5]. The toxicity of these metals largely depends on their chemical form, oxidation state, and bioavailability [6]. These metals can easily bind to proteins, enzymes, and cellular components, thereby disrupting vital physiological processes.

The rapid pace of industrialization, urbanization, and population growth has significantly contributed to the release of heavy metals into aquatic environments. Major sources include industrial effluents, mining operations, agricultural runoff, and improper disposal of municipal and electronic waste [7]. Once discharged into water bodies, heavy metals can accumulate in sediments and aquatic organisms, entering the food chain through bioaccumulation and biomagnification [8]. This not only affects aquatic life but also poses severe risks to human health through the consumption of contaminated water and food.

Exposure to heavy metals has been associated with numerous health problems, including neurological disorders, kidney damage, cancer, and developmental abnormalities[9]. In aquatic ecosystems, these metals can disrupt biological balance, reduce biodiversity, and impair reproductive and metabolic functions of organisms [10]. Therefore, monitoring and controlling heavy metal pollution is essential for maintaining environmental sustainability and protecting public health. In this context, the present review aims to provide a comprehensive overview of heavy metal pollution in water, focusing on their sources, mechanisms of toxicity, and various remediation techniques [11].

Problem Statement

Heavy metal contamination in water is a major environmental and public health issue due to its persistence, toxicity, and bioaccumulation potential. Metals such as Pb, Hg, Cd, As, and Cr enter water bodies through industrial and agricultural activities, posing serious risks to ecosystems and human health. Conventional treatment methods are often inadequate, as they may be inefficient at low concentrations and generate secondary waste. Advanced techniques provide better removal but are costly and energy-intensive. Therefore, there is a need for efficient, cost-effective, and sustainable remediation technologies for heavy metal removal from water [12].

Objectives

- To analyze sources of heavy metal pollution
- To understand toxicity mechanisms
- To evaluate remediation techniques
- To compare efficiency of different methods
- To suggest sustainable solutions

Scope of Study

This study focuses on major heavy metals present in aquatic systems, including Pb, Hg, Cd, As, and Cr, and their associated environmental and health impacts. It covers a wide range of remediation strategies, including chemical, physical, and biological techniques. The effectiveness, advantages, and limitations of these methods are evaluated based on existing literature, with an emphasis on sustainable and advanced treatment approaches [13].

Limitations

- The study is based on secondary data obtained from published literature.
- No experimental or field-based validation has been performed.
- Reported efficiencies of remediation techniques may vary depending on environmental conditions such as pH, temperature, and metal concentration.

Data Collection

Data for this study were collected from peer-reviewed journals, books, and reputable scientific databases such as Springer, Elsevier, Wiley, and Google Scholar. Research articles published between 1995 and 2024 were reviewed to ensure both foundational and recent developments in the field are included[1], [2], [4].

Research Methodology

A systematic literature review approach was adopted to analyze heavy metal pollution and its remediation techniques. Relevant studies were critically examined and compared based on parameters such as removal efficiency, operational cost, environmental impact, and feasibility. Data were organized using tabulation and interpreted through graphical representations to facilitate comparative analysis [7], [12].

Statistical Tools Used

- Comparative analysis of different remediation techniques
- Percentage efficiency evaluation for metal removal
- Graphical representation using bar charts, pie charts, and line graphs

Results and Discussion

Sources of Heavy Metal Pollution

Heavy metals originate from both natural and anthropogenic sources. Anthropogenic activities are the primary contributors, with industrial discharge accounting for approximately 40%, followed by mining (25%), agriculture (20%),

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and municipal waste (15%). These sources significantly influence the concentration and distribution of heavy metals in water bodies [4], [7].

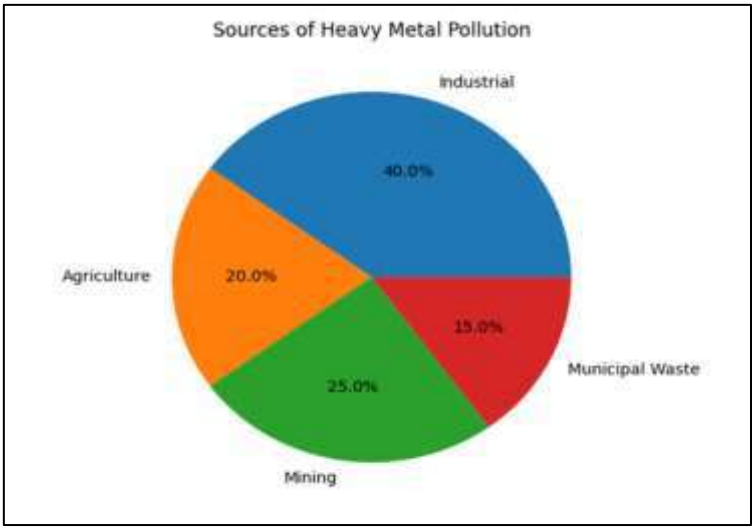

Figure 1: Sources of Heavy Metal Pollution

Toxicity Mechanism

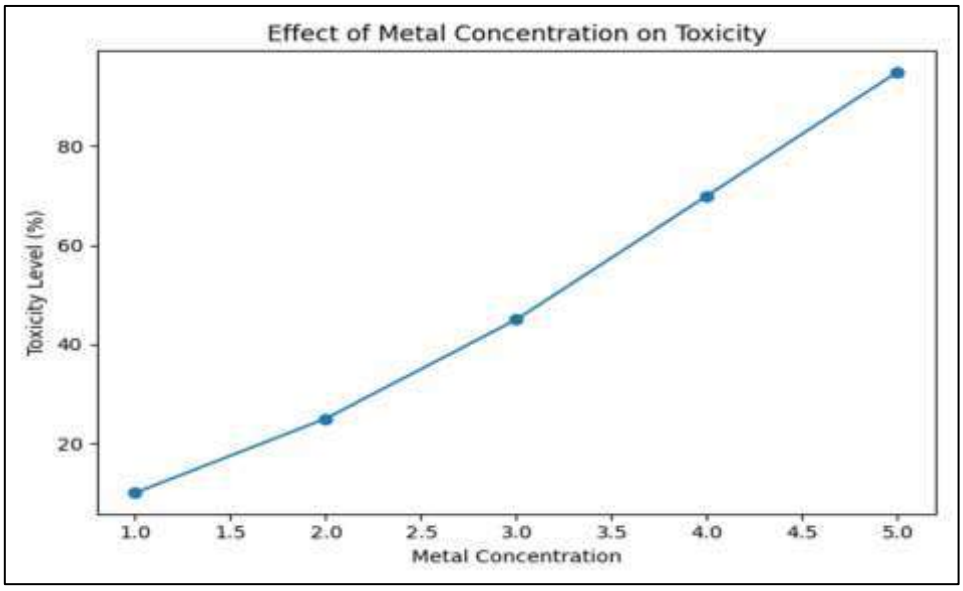

Figure 2: Toxicity vs Concentration Graph

Heavy metals exert toxic effects through multiple biochemical pathways, including enzyme inhibition, generation of reactive oxygen species (ROS), DNA damage, and interaction with cellular proteins. These mechanisms lead to severe health issues such as neurological disorders, kidney dysfunction, carcinogenic effects, and developmental abnormalities [9].

Remediation Techniques

Heavy metals can be removed from water using conventional, advanced, and biological methods, each having distinct advantages and limitations.

Conventional methods such as chemical precipitation, ion exchange, and adsorption are widely used due to their simplicity and cost-effectiveness. Chemical precipitation is suitable for large-scale treatment but produces sludge, while ion exchange offers high efficiency but is expensive. Adsorption is highly effective and can remove metals even at low concentrations [12], [14].

Advanced methods include membrane filtration (RO, UF, NF), electrochemical treatment, and nanotechnology-based adsorption. These techniques provide high removal efficiency and

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better water quality; however, they are costly and require sophisticated operation [11], [15].

Biological methods such as phytoremediation and biosorption are eco-friendly and sustainable. They use plants or microorganisms to remove heavy metals but are relatively slow compared to other techniques [8], [16].

Overall, advanced and hybrid techniques combining multiple methods are considered the most effective solutions for heavy metal removal [11].

Comparative Analysis:

Method	Efficiency (%)	Cost	Advantage	Limitation
Adsorption	85	Moderate	Simple	Regeneration issue
Membrane	95	High	High purity	Expensive
Phytoremediation	65	Low	Eco-friendly	Slow process
Nanotechnology	92	High	High efficiency	Toxicity concerns

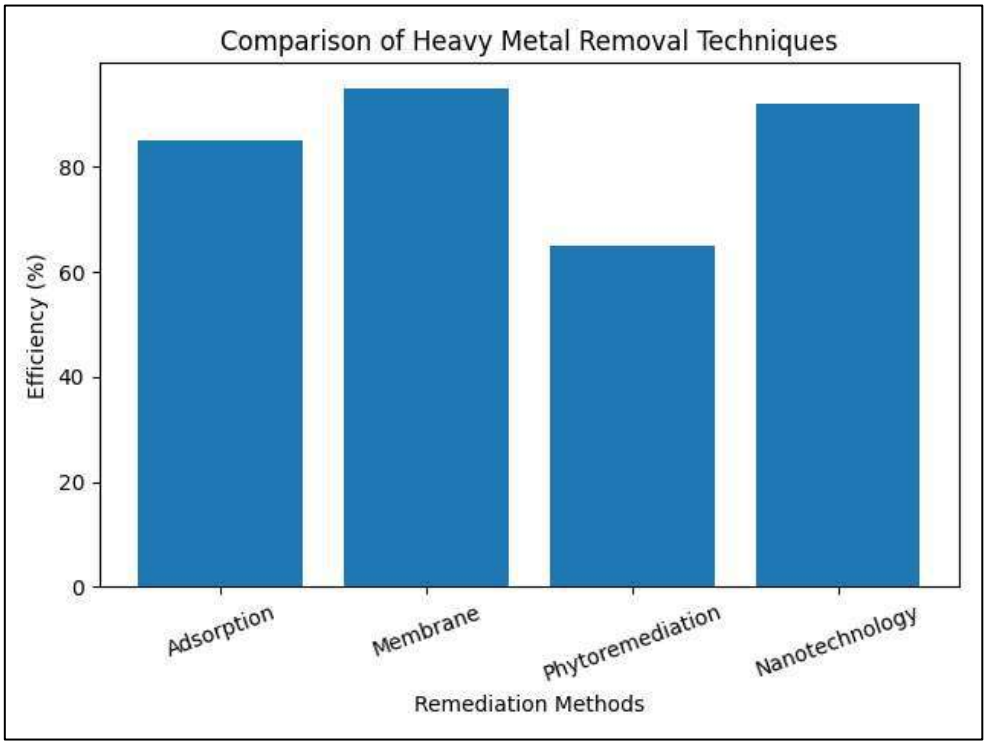

Figure 3: Remediation Efficiency Comparison

Advanced and nanotechnology-based methods demonstrate higher removal efficiency; however, their cost and operational complexity remain challenges. Hybrid techniques combining adsorption and nanomaterials show significant potential for future applications [15].

Conclusions

Heavy metal pollution in water represents a serious environmental and public health challenge due to its persistence, toxicity, and bioaccumulation potential. The study highlights that conventional treatment methods, while widely applied, are often inadequate for the complete removal of heavy metals, particularly at low concentrations. Advanced techniques such as membrane filtration and nanotechnology-based approaches demonstrate higher efficiency but are associated with higher costs and operational complexity. Overall, hybrid remediation strategies that combine conventional, advanced, and biological methods offer improved performance, cost-effectiveness, and sustainability. Therefore, an integrated and multidisciplinary approach is essential for efficient water treatment and long-term environmental protection.

Recommendations

- Adoption of hybrid remediation systems combining conventional and advanced techniques
- Development and utilization of low-cost, efficient, and sustainable adsorbents
- Implementation of strict regulations and monitoring of industrial effluent discharge
- Promotion of eco-friendly and green nanotechnology-based treatment methods

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- Continuous monitoring and assessment of water quality to ensure safety and sustainability

Funding:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Credit Authorship Contributions Statement:

Kajal R. Gaikwad: Literature survey, data curation, visualization, and drafting of the manuscript.

Mrugaya S. Thakur: Conceptualization, methodology, critical review, and editing of the manuscript.

Vishal A. Naik: Conceptualization, supervision, validation, writing-original draft preparation, writing-review and editing, and corresponding author responsibilities.

Declaration of Competing Interest:

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this review.

Consent to Publish Declaration:

Not applicable.

Ethics and Consent to Participate Declarations:

Not applicable.

Data Availability:

No new data were generated or analyzed in this review. Any data discussed in this article is derived from previously published studies. Further information can be obtained from the corresponding author upon reasonable request.

Acknowledgement:

The authors sincerely acknowledge the Department of Chemistry, Mahatma Phule Arts, Science, and Commerce College, Panvel, Navi Mumbai, India, for providing the necessary academic support and facilities to carry out this work.

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Geopolitical Conflict in West Asia and its Implications for India's Energy Policy

T. Y. Ranadive
Assistant Professor, Dept. of Pol. Sci.S. S. G. M. College, Kopargaon

Manuscript ID:
BN-2026-030328

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 127-130

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840594
DOI link:
https://doi.org/10.5281/zenodo.20840594

Abstract

West Asia remains one of the most geopolitically volatile regions in the world, holding a central position in global energy supply chains. India, as one of the fastest-growing economies, is heavily dependent on this region for its energy needs. Recent geopolitical conflicts, particularly the 2026 escalation involving Iran, Israel and allied powers, have exposed the vulnerability of India's energy security architecture. This paper examines the nature of geopolitical conflicts in West Asia, analyses their impact on global energy markets, and evaluates the implications for India's energy policy. It argues that India must adopt a multi-pronged strategy involving diversification, strategic reserves, renewable transition and diplomatic balancing to ensure long-term energy security energy security.

Keywords: *West Asia, India, geopolitics, Iran, Israel and allied powers.*

Introduction:

West Asia is a critical hub of global energy production, accounting for a substantial share of the world's oil and natural gas reserves. For India, the region is indispensable: it supplies more than half of its crude oil and a significant portion of liquefied natural gas (LNG). However, persistent geopolitical tensions ranging from US-Iran rivalry to regional conflicts involving Israel and Gulf states have created recurring disruptions in energy flows. The 2026 conflict, particularly disruptions in the Strait of Hormuz, has once again highlighted the fragility of global energy supply chains and India's dependence on them. This paper explores how such conflicts shape India's energy policy and what strategic adjustments are necessary?

Objectives of the Study:

1.To examine the nature and underlying causes of geopolitical conflicts in West Asia.
2. To analyse the impact of these conflicts on global energy markets.
3.To evaluate the implications of geopolitical instability in West Asia for India's energy policy and energy security.

Scope:

The scope of this study focuses on analysing the impact of geopolitical conflicts in West Asia on the energy security and policy framework of India. It examines key energy-producing countries, major supply routes such as the Strait of Hormuz and their vulnerability during conflicts. The study primarily covers oil and natural gas sectors and evaluates India's policy responses, including diversification, strategic reserves and renewable energy transition.

Limitation:

It is primarily confined to the geopolitical context of West Asia and its impact on India's energy policy, thereby excluding other important energy regions such as Africa and Latin America. The analysis is based on secondary data, which may be subject to availability and reliability constraints. The study adopts a macro-level approach and does not include micro-level or sector-specific case studies. Additionally, rapidly changing geopolitical dynamics and market conditions may limit the long-term applicability of the findings. The study also focuses mainly on oil and natural gas giving limited attention to other energy sources.

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Address for correspondence:
T. Y. Ranadive, Assistant Professor, Dept. of Pol. Sci.S. S. G. M. College, Kopargaon
Email- tyrandive@gmaol.com

How to cite this article:
Ranadive, T. Y. (2026). Geopolitical Conflict in West Asia and its Implications for India's Energy Policy. Bulletin of Nexus Journal, 3(3(II)), 127–130. https://doi.org/10.5281/zenodo.20840594

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Research Methodology:

The present study adopts a qualitative and analytical research design to examine the impact of geopolitical conflicts in West Asia on India's energy policy. The research is primarily based on secondary data collected from government reports, policy documents, research articles & books.

Conflicts in West Asia:

Geopolitical conflicts in West Asia are shaped by a complex interplay of historical, political, economic and strategic factors making the region one of the most volatile in the world. One of the primary causes is historical legacy and territorial disputes. The arbitrary borders drawn during the colonial period, particularly after the collapse of the Ottoman Empire, created states with deep internal divisions and unresolved territorial claims. These historical grievances continue to fuel conflicts among nations and communities.

Another major factor is sectarian divisions, especially between Sunni and Shia groups. Countries like Saudi Arabia and Iran often represent these sectarian poles and their rivalry extends beyond borders, influencing conflicts in countries such as Yemen, Syria, and Iraq. This sectarian competition intensifies regional instability and turns local conflicts into broader proxy wars. Control over energy resources is also a critical cause. West Asia holds a significant share of the world's oil and natural gas reserves, making it strategically vital. Competition for control over these resources as well as key transit routes, leads to both internal and external conflicts. Strategic chokepoints like the Strait of Hormuz further heighten tensions, as disruptions here can impact global energy supplies. The region is also heavily influenced by external powers. Global actors such as the United States, Russia, and China have vested interests in maintaining influence over West Asia due to its energy resources and strategic location. Their involvement often exacerbates conflicts, either through direct intervention or by supporting different regional actors, thereby prolonging instability.

On the other hand many countries have authoritarian regimes, weak democratic institutions, and limited political participation. This often leads to internal unrest, uprisings, and civil wars, as seen during the Arab Spring. Governance issues, corruption and lack of economic opportunities further intensify dissatisfaction among populations.

Impact of the conflicts on global energy markets:

Geopolitical conflicts in West Asia have a profound impact on global energy markets, as the region accounts for a significant share of the world's oil and natural gas production. Any instability in this area directly affects the availability, pricing and distribution of energy resources worldwide.

Supply disruption:

One of the most immediate impacts is supply disruption. Conflicts often damage energy infrastructure such as oil fields, refineries and pipelines leading to reduced production and export capacity. Additionally, tensions in critical transit routes like the Strait of Hormuz can restrict the movement of oil shipments, creating uncertainty in global supply chains.

Price volatility:

Another major effect is price volatility. Geopolitical tensions tend to increase oil prices due to the "risk premium" associated with potential supply shortages. Even the threat of conflict can trigger sharp fluctuations in global crude oil prices, affecting both importing and exporting countries. Rising energy prices also contribute to global inflation, increasing the cost of transportation, manufacturing, and essential goods.

Market instability and uncertainty:

Conflicts in West Asia also lead to market instability and uncertainty. Investors and energy companies often face unpredictable conditions, which can delay investments in exploration and production. This affects long-term energy supply and market stability. Moreover, countries may resort to stockpiling energy resources during crises, further tightening global supply.

Shift in global energy trade patterns:

One of the important impact is the shift in global energy trade patterns. Import-dependent countries seek alternative suppliers to reduce risk, leading to changes in trade routes and partnerships. This diversification, while necessary, can increase transportation costs and logistical challenges.

Furthermore, geopolitical conflicts often result in increased competition for limited resources, especially during prolonged crises. Developing countries are particularly affected, as they may struggle to secure affordable energy supplies in a highly competitive market.

Implications for India's energy policy:

Geopolitical instability in West Asia has significant implications for India's energy policy and overall energy security. As one of the world's fastest-growing economies India relies heavily on imports to meet its energy demands with a substantial portion of crude oil and natural gas sourced from West Asia.

Risk to energy security:

One of the most critical implications is the risk to energy security. Conflicts in West Asia often disrupt production facilities, pipelines, and shipping routes, leading to uncertainties in supply.

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Strategic chokepoints such as the Strait of Hormuz play a crucial role in global energy transportation and any disturbance in this route can severely impact India's oil imports. Even temporary disruptions can create shortages and force India to seek alternative suppliers at higher costs.

Price volatility:

Another major implication is price volatility. Geopolitical tensions typically result in fluctuations in global oil and gas prices. For India, rising energy prices increase the import bill, putting pressure on the current account deficit and leading to currency depreciation. This affects inflation, as higher fuel costs raise transportation and production expenses across various sectors of the economy. Consequently, energy price shocks can slow down economic growth and impact fiscal stability.

Re-evaluate and diversify its energy policy:

Geopolitical instability also compels India to re-evaluate and diversify its energy policy. To reduce dependence on a single region. India has increasingly sought alternative energy sources and suppliers from regions such as Russia, Africa, and the Americas. Diversification not only enhances energy security but also provides flexibility in times of crisis. However, shifting supply chains involves logistical challenges and may increase transportation costs.

Strategic petroleum reserves (SPR):

Another important implication is the growing emphasis on strategic petroleum reserves. Recognising the vulnerability of external dependence, India has developed emergency oil storage facilities to buffer against short-term supply disruptions. However, the current capacity of these reserves may not be sufficient to withstand prolonged geopolitical crises, indicating the need for further expansion and better management.

Energy diplomacy and strategic balancing:

Finally, geopolitical tensions necessitate careful energy diplomacy and strategic balancing. India maintains relations with multiple countries in West Asia, including those with conflicting interests. Balancing these relationships while ensuring a stable energy supply is a complex diplomatic challenge. India must navigate these dynamics cautiously to protect its national interests without compromising strategic partnerships.

Conclusion:

Geopolitical instability in West Asia continues to significantly influence India's energy security and policy framework. Heavy dependence on the region exposes India to supply disruptions, price volatility and economic risks. The study highlights the urgent need for a diversified energy strategy, expansion of strategic reserves and accelerated adoption of renewable energy. Strengthening energy diplomacy and securing critical routes such as the Strait of Hormuz are equally essential. A balanced and forward-looking approach will enable India to enhance resilience and ensure sustainable long-term energy security.

Acknowledgment

I would like to express my sincere gratitude to all those who have contributed to the successful completion of this study on *"Geopolitical Conflict in West Asia and its Implications for India's Energy Policy."*

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their continuous guidance, valuable insights, and encouragement throughout this work. Their support has been instrumental in shaping my understanding of complex geopolitical and energy-related issues.

I am also deeply thankful to the scholars, researchers, and authors whose works have provided a strong analytical and theoretical foundation for this study. Their contributions have greatly enriched the depth and perspective of this research.

My sincere appreciation goes to institutions, policy research organizations, and energy agencies that provide valuable data and insights into geopolitical developments and energy policy frameworks.

I would like to acknowledge the unwavering support of my friends and family, whose encouragement and motivation helped me complete this work successfully.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Higher Education and Sustainable Entrepreneurship: Promoting Innovation and Startups in the Cold Pressed Oil Sector in Daund and Baramati Taluka

Preeti Rajesh Watharkar
Assistant Professor, Daund Taluka Arts and Commerce College, Daund
Affiliated to Savitribai Phule Pune University

Manuscript ID:
BN-2026-030329

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 131-133

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840641
DOI link:
https://doi.org/10.5281/zenodo.20840641

Abstract

This research investigates the dynamic interplay between higher education and sustainable entrepreneurship with a specific focus on innovation and startup development in the cold pressed oil sector across Daund and Baramati talukas. The study analyses how institutions of higher learning contribute to entrepreneurial competencies, technological adoption, innovation capability, and Intellectual Property Rights (IPR) awareness among rural entrepreneurs. Through an extensive mixed-method approach involving surveys, interviews, and secondary market data, the study provides a comprehensive assessment of the current status of the cold pressed oil market, challenges faced by entrepreneurs, and the extent to which higher education frameworks support them. The study concludes that academic institutions significantly shape entrepreneurial behaviour by fostering innovation-oriented thinking, encouraging research participation, and supporting startup incubation. Further, the findings underscore the need for stronger academia–industry linkages to enhance economic diversification, product quality, and sustainability of rural enterprises.

Keywords: *Higher Education, Sustainable Entrepreneurship, Innovation, Startups, IPR, Cold Pressed Oil, Rural Industry, Daund, Baramati*

Introduction

The transformation of the agricultural and agro-based sectors in India has opened new opportunities for sustainable entrepreneurship. The cold pressed oil sector, which traditionally relied on indigenous extraction methods, has recently experienced a revival due to rising consumer demand for chemical-free and nutritionally rich edible oils. Daund and Baramati talukas of Pune district have witnessed substantial growth in such enterprises, supported primarily by local entrepreneurs. However, the strategic role of higher education in enhancing entrepreneurial competencies, introducing modern technologies, and promoting IPR literacy remains underexplored. Higher education institutions (HEIs) play a pivotal role in shaping entrepreneurial mindsets through skill enhancement, innovation-driven curricula, incubation facilities, and research exposure. This study aims to bridge the gap by examining the extent to which higher education influences sustainable business practices and innovation in the cold pressed oil industry.

Significance of Study

The study is significant for three primary reasons. First, it provides an in-depth understanding of how higher education contributes to rural entrepreneurship, particularly in the agro-processing industry. Second, it analyses the factors influencing innovation and startup growth within the cold pressed oil sector, offering valuable insights for policymakers, academic institutions, and business stakeholders. Third, the study contributes to existing literature by integrating aspects of IPR, sustainability, and innovation in a rural context, offering a multidimensional perspective on the entrepreneurial ecosystem of Daund and Baramati

Objectives of Study

1. To assess the role of higher education in enhancing entrepreneurial skills among cold pressed

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Address for correspondence:
Preeti Rajesh Watharkar, Assistant Professor, Daund Taluka Arts and Commerce College, Daund, Affiliated to Savitribai Phule Pune University
Email: pvavhal15@gmail.com

How to cite this article:
Watharkar, P. R. (2026). Higher Education and Sustainable Entrepreneurship: Promoting Innovation and Startups in the Cold Pressed Oil Sector in Daund and Baramati Taluka. Bulletin of Nexus Journal, 3(3(II)), 131–133. https://doi.org/10.5281/zenodo.20840641

Quick Response Code:

Website: https://bnir.us

oil manufacturers.
2. To evaluate the impact of higher education on innovation, technology adoption, and IPR awareness.
3. To analyse the growth and characteristics of startups operating in the cold pressed oil sector in Daund and Baramati.
4. To identify challenges faced by rural entrepreneurs and propose strategies for strengthening the academia–industry interface.

Hypothesis

H1: Higher education significantly influences innovation and startup development in the cold pressed oil sector.
H2: Awareness of IPR and technological advancements is positively associated with the educational exposure of entrepreneurs.
H3: Strong academic linkages contribute to improved sustainability and competitiveness of cold pressed oil enterprises.

Literature Review

Previous studies highlight the crucial role of higher education in developing entrepreneurial ecosystems. According to several scholars, HEIs contribute by providing knowledge resources, incubation support, and skill-based training. Research also indicates that innovations in agro-processing technologies enhance product quality and business sustainability. Studies on rural entrepreneurship reveal that lack of awareness regarding IPR often limits entrepreneurs from safeguarding their innovations. However, limited studies have explored these dynamics specifically within the cold pressed oil sector, making this research essential.

Scope of Study

The study focuses on cold pressed oil enterprises situated in Daund and Baramati talukas. It covers manufacturing methods, entrepreneurial background, educational influence, startup capacity, innovation adoption, and IPR understanding. The study also compares the growth trajectory of enterprises established before and after the introduction of modern educational and incubation frameworks.

Limitations of Study

1. Primary data availability is limited by the willingness of entrepreneurs to share detailed financial and operational information.
2. The geographical focus is restricted to two talukas, limiting generalisation.
3. Time constraints restricted the longitudinal evaluation of enterprises.
4. Some respondents may have provided incomplete information due to lack of documentation.

Research Methodology

This study adopts a mixed-methods approach including qualitative and quantitative techniques. Primary data were collected through structured questionnaires, direct interviews with 60 entrepreneurs, and field observations. The sampling technique used was purposive sampling due to the limited number of registered cold pressed oil units. Secondary data were sourced from government reports, market studies, academic journals, MSME databases, and agricultural development statistics. Quantitative data were analysed using descriptive statistics, correlation analysis, and graphical representation. Qualitative insights were analysed using thematic analysis.

Primary Data

Primary data from 60 entrepreneurs revealed that 72% had educational qualifications above secondary school level, while 28% had higher education degrees. Most entrepreneurs believed that exposure to academic institutions improved their understanding of technology, marketing, branding, and IPR. 65% adopted modern machines due to awareness gained through training programmes.

Secondary Data

Secondary data emphasise a gradual rise in cold pressed oil units due to health consciousness among consumers. Government MSME records show that the number of cold pressed oil startups in these talukas has steadily increased since 2020. Data indicates strong future potential driven by demand for organic products.

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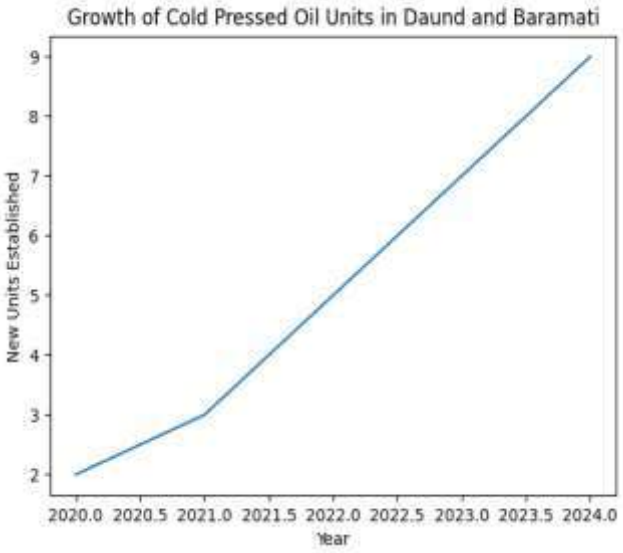
Graph: Growth of Units



Analysis and Discussion

Analysis of primary and secondary data confirms a strong correlation between higher education and entrepreneurial performance. Educated entrepreneurs demonstrated better capacity for technological adoption, digital marketing, product differentiation, and branding. The findings indicate that innovation is strengthened through structured academic exposure. Entrepreneurs with higher education were more likely to adopt improved extraction machinery, implement hygienic production practices, and understand the legal framework of IPR.

Results and Findings

The results indicate that higher education strongly influences sustainable entrepreneurial practices in the cold pressed oil industry. The study also reveals that entrepreneurs who participated in university-led workshops were more likely to file for trademarks or introduce value-added products such as herbal oils, blended oils, and packaged organic oils.

Conclusion

Higher education institutions play a transformative role by enabling rural entrepreneurs to adopt innovation-driven business strategies. The study concludes that strengthening HEI–industry collaborations, improving IPR awareness, and offering targeted training programmes can significantly enhance the competitiveness and sustainability of cold pressed oil startups in Daund and Baramati.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Higher Education and Sustainable Entrepreneurship: Promoting Innovation and Startups in the Cold Pressed Oil Sector in Daund and Baramati Taluka*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of sustainable entrepreneurship, higher education, and innovation in the cold pressed oil sector.

I would also like to acknowledge the contributions of researchers, academicians, policymakers, and industry experts whose work on entrepreneurship, rural development, and sustainable business practices provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Finally, I am deeply grateful to my family for their unwavering support, patience, and motivation, which made the successful completion of this project possible.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Digital Marketing: Trends, Challenges and Future Prospects

Bangar Moresh Kamalakar
S.S.G.M. College, Kopargaon, Dist -Ahilyanager

Manuscript ID:
BN-2026-030330

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 134-137

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840692
DOI link:
https://doi.org/10.5281/zenodo.20840692

Abstract

Digital marketing has revolutionized the way businesses interact with customers in the modern economy. With the rapid growth of internet penetration, mobile technology, and social media platforms, organizations are increasingly shifting from traditional marketing methods to digital channels. This research paper examines the concept, tools, significance, and impact of digital marketing on business performance and consumer behaviour. Digital marketing encompasses various techniques such as search engine optimization (SEO), social media marketing, email marketing, content marketing, and pay-per-click (PPC) advertising, which help businesses reach a global audience efficiently.

The primary objective of this study is to analyse the effectiveness of digital marketing strategies in enhancing brand awareness, customer engagement, and sales performance. The paper also explores how digital platforms provide measurable outcomes through analytics, enabling organizations to make data-driven decisions. Furthermore, the study highlights the role of emerging technologies such as artificial intelligence, big data, and automation in transforming digital marketing practices.

Despite its advantages, digital marketing faces several challenges, including data privacy concerns, increasing competition, and the need for continuous technological adaptation. This research is based on secondary data collected from journals, books, and online sources, using descriptive and analytical methods. The findings suggest that digital marketing is a cost-effective and highly impactful tool for modern businesses. It not only enhances communication but also builds long-term relationships with customers. The study concludes that digital marketing will continue to evolve and remain a critical component of business strategy in the future.

Keywords: *Digital Marketing, SEO, Social Media, Content Marketing, Consumer Behavior, Online Advertising*

Introduction

Digital marketing has emerged as one of the most significant developments in the field of marketing in the 21st century. With the rapid advancement of technology and the widespread use of the internet, businesses have transformed the way they communicate and interact with customers. Digital marketing refers to the promotion of products and services using digital channels such as websites, search engines, social media platforms, email, and mobile applications. It enables organizations to reach a large and diverse audience in a cost-effective and measurable manner.

In recent years, the growth of smartphones and affordable internet access has accelerated the adoption of digital marketing across the globe. Consumers today are more connected, informed, and empowered than ever before. They rely heavily on online platforms to search for information, compare products, read reviews, and make purchasing decisions. As a result, businesses are increasingly focusing on digital strategies to influence consumer behavior and build long-term relationships.

Unlike traditional marketing methods, digital marketing provides real-time interaction and feedback. It allows businesses to engage directly with their target audience through personalized communication. Tools such as search engine optimization (SEO), social media marketing, content marketing, and email marketing help organizations enhance their visibility and attract potential customers.

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Address for correspondence:
Bangar Moresh Kamalakar,S.S.G.M. College, Kopargaon, Dist -Ahilyanager.
Email: bangar.moresh@gmail.com

How to cite this article:
Kamalakar, B. M. (2026). Digital Marketing: Trends, Challenges and Future Prospects. Bulletin of Nexus Journal, 3(3(II)), 134–137. https://doi.org/10.5281/zenodo.20840692

Quick Response Code:

Website: https://bnir.us

Moreover, digital marketing offers advanced analytics and data tracking capabilities, enabling companies to measure the effectiveness of their campaigns and make data-driven decisions.

Another important aspect of digital marketing is its ability to create brand awareness and customer loyalty. Through consistent online presence and engaging content, businesses can establish a strong brand identity. Social media platforms play a crucial role in this process by allowing companies to interact with customers, respond to their queries, and build trust. Furthermore, digital marketing supports small and medium enterprises by providing them with equal opportunities to compete with larger organizations in the market.

However, digital marketing also presents certain challenges. Issues such as data privacy, cybersecurity risks, and increasing competition require businesses to continuously update their strategies and adopt ethical practices. The dynamic nature of digital technologies demands constant learning and adaptation from marketers. Despite these challenges, the importance of digital marketing continues to grow due to its flexibility, scalability, and effectiveness.

In conclusion, digital marketing has become an integral part of modern business operations. It has not only changed the way products are marketed but also how consumers perceive and interact with brands. As technology continues to evolve, digital marketing is expected to play an even more critical role in shaping the future of business and communication.

Objectives of the Study

1. To understand the concept and importance of digital marketing.
2. To analyze various tools and techniques used in digital marketing.
3. To examine the impact of digital marketing on consumer behavior.
4. To evaluate the effectiveness of digital marketing strategies.
5. To identify challenges and future prospects of digital marketing.

Scope of the Study

The study focuses on digital marketing strategies used by businesses worldwide. It includes tools like SEO, social media, and email marketing. The research is limited to secondary data and does not include primary surveys. It provides insights into trends, benefits, and challenges of digital marketing.

Research Methodology

This research is based on secondary data collected from books, journals, research papers, and online sources. Descriptive and analytical approaches are used to interpret the data. The study aims to provide a comprehensive understanding of digital marketing concepts and practices.

Concept of Digital Marketing

Digital marketing involves promoting products and services using digital technologies such as the internet, mobile devices, and social media platforms. It allows businesses to interact directly with customers and personalize their marketing strategies.

Tools and Techniques of Digital Marketing

1. **Search Engine Optimization (SEO) :** SEO is the process of improving website visibility on search engines to increase organic traffic.
2. **Social Media Marketing :** Social media platforms like Facebook, Instagram, and LinkedIn are used to promote products and engage customers.
3. **Content Marketing :** Content marketing focuses on creating valuable and relevant content to attract and retain customers.
4. **Email Marketing :** Email marketing helps businesses communicate directly with customers and build relationships.
5. **Pay-Per-Click Advertising (PPC) :** PPC is a paid advertising method where businesses pay for each click on their ads.

Impact of Digital Marketing on Consumer Behavior

Table 1: Comparison between Traditional Marketing and Digital Marketing

Basis	Traditional Marketing	Digital Marketing
Cost	High	Low
Reach	Limited	Global
Interaction	One-way	Two-way
Measurement	Difficult	Easy & Accurate
Flexibility	Less	High

Table 2: Popular Digital Marketing Channels and Their Usage

Channel	Purpose	Example

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SEO	Increase website visibility	Google Search
Social Media	Customer engagement	Facebook, Instagram
Email Marketing	Direct communication	Newsletters
PPC Advertising	Paid promotion	Google Ads
Content Marketing	Inform & attract customers	Blogs, Videos

Graph 1: Growth of Digital Marketing Usage (2018–2025)

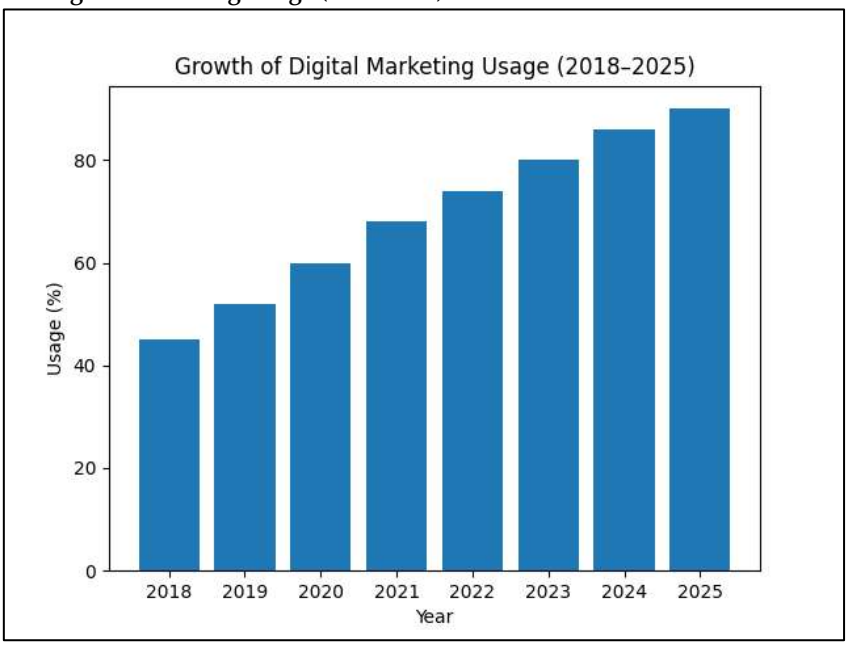

Figure 1: Growth of Digital Marketing Usage (2018–2025)
Source: Secondary Data (Compiled by Researcher)
Interpretation: The above bar chart clearly shows a continuous increase in digital marketing usage from 45% in 2018 to 90% in 2025. This indicates rapid adoption of digital platforms due to increased internet penetration, smartphone usage, and business digitalization. The trend highlights that digital marketing has become a dominant strategy for organizations worldwide.

Graph 2: Consumer Preference for Marketing Channels

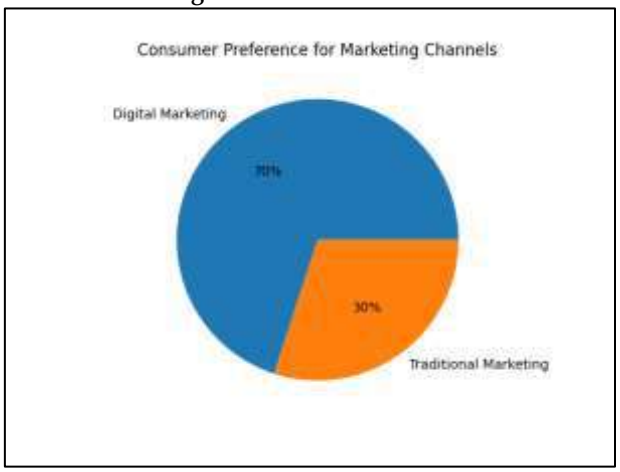

Figure 2: Consumer Preference for Marketing Channels
Source: Secondary Data (Compiled by Researcher)
Interpretation: The pie chart shows that 70% of consumers prefer digital marketing channels, while only 30% rely on traditional marketing. This reflects a shift in consumer behavior towards online platforms due to convenience, accessibility, and personalized content.

Advantages of Digital Marketing

- Cost-effective
- Global reach

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- Measurable results
- Targeted advertising
- Better customer engagement

Challenges of Digital Marketing

- Data privacy and security issues
- High competition
- Rapid technological changes
- Need for skilled professionals

Future Trends in Digital Marketing

- Artificial Intelligence (AI)
- Voice Search Optimization
- Influencer Marketing
- Video Marketing
- Automation Tools

Conclusion

Digital marketing has become an essential part of modern business strategy. It offers numerous benefits, including cost efficiency, global reach, and measurable outcomes. Businesses must continuously adapt to technological changes to remain competitive. The future of digital marketing is promising, driven by innovation and data-driven strategies.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *Digital Marketing: Trends, Challenges and Future Prospects*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of digital marketing trends, strategies, and emerging challenges.

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Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

A Study of Industrial Development and employee

Rajashri Yadav Sawant[1] Dr. Vaishali M. Deshpande[2]
[1]Research Scholar H.V. DESAI College Commerce, Arts and Science Hutatma Rajguru Mahavidyalaya, Rajgurunagar Pune,
[2]Research Guide, Shri Siddhivinayak Mahavidyalaya Karvenagar Pune

Manuscript ID:
BN-2026-030331

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 138-140

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840751
DOI link:
https://doi.org/10.5281/zenodo.20840751

Abstract

Industrial development is important for every country Business technology, Government, Workers These factors are included in this and there are many benefits of industrial development, which creates a large number of jobs. The domestic market is developing Industrial development faces challenges such as regulatory reforms, skills and education as well as lack of infrastructure, and employees are an important factor in industrial development.

Industrial development is important for every country and it helps in increasing the national income of the country Industrial development increases productivity and customer satisfaction Business reputation and employee centric culture Develop Industrial development creates a large number of jobs and the establishment of various foreign companies generates a large amount of foreign exchange and develops the domestic market, so industrial development has an important place for every country.

Key words*- Industrial Development, Productivity, Employee, Employee contribution*

Research methodology

The research is a literature-based study investigation the current issue Paral rally we also relied on secondary data from various journals authentic web sides and internet.

Objective

1) To understand concept of Industrial Development
2) To understand why employee is important in industry
3) To understand Benefits of industrial development

Introduction

Industrial development in India began in 1854 with the establishment of a modern cotton textile mill at Bombay. Economic growth and government-aided research grants driven by international competition Industries. Government to enhance the country's innovation system by advancing technology-focused industries through cooperation between universities and research institutes. Government some guidelines for the development of technology-focused industries from limited resources.The concept of innovation has long been used for the development of the industry.

In short, industrial development is the use and analysis of the effects of the four factors of business, technology, government and labour, the success of an industrial project depends on the effectiveness of these four factors, natural factors are available according to different regions and accordingly industries are coming into existence in different places, which raises the standard of living of the people, increases the per capita income. This is called industrial development, unemployment, Poverty,Hunger.

Building and growing industries in the economy using new technologies is meant to increase employment and business output and increase profitability.

India's adoption of liberalisation privatization and globalization in 1991 has paved the way for industrial expansion, foreign direct investment has increased significantly, many multinational companies have been formed and the number of domestic industries has increased.

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Address for correspondence:
Rajashri Yadav Sawant,Research Scholar H.V. DESAI College Commerce, Arts and Science Hutatma Rajguru Mahavidyalaya, Rajgurunagar Pune,
Email-rajashrisawant1185@gmail.com

How to cite this article:
Sawant, R. Y., & Deshpande, V. M. (2026). A Study of Industrial Development and employee. Bulletin of Nexus Journal, 3(3(II)), 138–140. https://doi.org/10.5281/zenodo.20840751

Quick Response Code:

Website: https://bnir.us

Meaning of Industrial development -

Industrial development is the process of expanding an economy's industrial base through technological innovation, increased manufacturing output, and infrastructure growth.

Definition -

"Industrial development is the growth of secondary activities like manufacturing, processing and related services, leading to higher output and economic transformation"

Scope

Industrial development drive job creation in manufacturing, services, and emerging sector like technology and renewables, absorbing surplus labour from agriculture. It promotes skill training program to improve employability and support industrial relation for harmonious employer employee dynamic, including conflict resolution and labour laws. This foster industrial democracy, where workers influence decision, enhancing satisfaction and organization growth.

Industrial development in India--

India has major industrial growth after liberalization (1991) sector includes-

Automobile, Manufacturing and engineering, IT and services, Pharmaceuticals. industrial hubs like Pune region have become centers of employment and innovation.

Benefits of industrial development

1) A pool of skilled and skilled workers has been created in the country, which is leading to the establishment of foreign companies in India.

2) India has created a huge domestic market and automobiles electronic consumers are being attracted to invest in the pharmaceutical products sector.

3) The growth of the information technology and business process outsourcing sector has been boosted.

India is the largest producer of two-wheelers, three-wheelers and passenger vehicles India has made progress in the renewable energy sector. The government has given a boost to solar and wind energy, which has expanded the investment potential in this sector.

Challenges in Industrial Development

1) **Infrastructure development**.

India lacks transport, network, power supply, logistics facilities and needs to provide infrastructure

2) **Skills and Education**-

There is a need to implement employee education skills programs for the high number of employees in India and fewer employees with skills.

3) **Regulatory reforms**:

The government has drastically changed the business environment and at the same time regulatory reforms are required.

The government is playing an important role in industrial development, including formulating policies, financial incentive subsidies Establishment of special economic zones, skill development, research and development and attracting investment in key sectors.

worker

A person working for a company or industry is called a worker

Every person who performs physical and mental labor in exchange for material and material form is called a worker.

Employees' contribution to industrial development

1) **Productivity**-

Employees work to bring new ideas to reality New goods and services Create new goods and services Boost growth The business works effectively and efficiently Due to employees, the business works effectively and efficiently Employee productivity and effectiveness are related to the success of the company.

2) Customer satisfaction

Employees work to provide excellent service to customers Customer needs are solved by understanding their grievance problems Accurate information is sent to customers on time Employees work to build trust in customers' business So employees should develop motivation training and create a positive environment.

3) Reputation

Company's employee customer shareholders impact the company's reputation and impact Employees are trained and treated with respect, create positive brands Can enhance positive customer experience

4) Employee-centric culture

Employees have a vital place in success and challenging and fulfilling work Regular and positive feedback Adherence to high ethical standards such as member participation in decision-making makes the business successful.

5) Inclusion

Accommodating employees creates a positive workplace environment The organization's value on workplace culture Increases the value of the organization on workplace culture The importance of customer and employee happiness creates an environment that promotes productivity by investing in employee training development, business can create an employee-centric work environment by investing in employee training development.

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Finding -

1. Industrial growth improve income but increase stress.
2. Contract job is rising, reducing job security.
3. Worker face both economic benefits and social challenges.
4. Industrial sickness severely impacts employee.

Suggestion -

1) Improve job security policies.
2) Provide health and safety measures
3) Skill development program.
4) Government support for sick industries.
5) Better work - life balance initiative.

Conclusion

Industrial development is important for every country and it helps in increasing the national income of the country Industrial development increases productivity and customer satisfaction Business reputation and employee centric culture Develop Industrial development creates a large number of jobs and the establishment of various foreign companies generates a large amount of foreign exchange and develops the domestic market, so industrial development has an important place for every country.

Acknowledgment

I would like to express my sincere gratitude to all those who have contributed to the successful completion of this work on *"Sixth Schedule as the Guardian of Tribal Identity: A Special Focus on the Bodoland Territorial Council."*

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their constant guidance, valuable insights, and encouragement throughout the course of this study. Their academic support has been instrumental in shaping my understanding of the subject.

I am also deeply thankful to the scholars, authors, and researchers whose works have provided a strong foundation for this study. Their contributions to the field have been invaluable.

My sincere appreciation goes to the institutions and organizations that have preserved and documented information related to the Sixth Schedule and the Bodoland Territorial Council, making it accessible for academic purposes.

I would like to acknowledge the support of my friends and family for their encouragement, patience, and moral support during the preparation of this work.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Role of Higher Education in Promoting Research, Innovation, Startups, and Intellectual Property Rights: A Conceptual Study

Arun Parasram Kadam
Assistant Professor, C.D. Jain College of Commerce, Shrirampur

Manuscript ID:
BN-2026-030332

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 141-143

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840803
DOI link:
https://doi.org/10.5281/zenodo.20840803

Abstract

Higher education plays a vital role in shaping modern economies by promoting research, innovation, startups, and intellectual property rights (IPR). In today's competitive business environment, universities are no longer limited to traditional teaching but are actively involved in knowledge creation, entrepreneurial development, and commercialization of ideas. Business administration education, in particular, equips students with managerial, analytical, and strategic skills required to transform innovative ideas into successful ventures.

The present study aims to examine the role of higher education institutions in fostering research culture, encouraging innovation, supporting startups, and creating awareness about IPR. The study is conceptual in nature and based on secondary data collected from journals, reports, and academic literature.

The findings indicate that higher education institutions act as innovation hubs by providing incubation centers, research facilities, and industry collaboration opportunities. They also contribute to startup ecosystems and promote intellectual property awareness among students. However, challenges such as lack of funding, limited industry-academia collaboration, and inadequate IPR awareness still exist.

The study concludes that strengthening higher education systems is essential for promoting sustainable innovation and entrepreneurial growth in the economy.

Keywords: *Higher Education, Innovation, Startups, Intellectual Property Rights, Business Administration, Entrepreneurship, Research, Incubation*

Introduction

In the 21st century, higher education has become a key driver of economic development and social transformation. Universities and management institutions are not only centers of learning but also hubs of research, innovation, and entrepreneurship. With the rise of knowledge-based economies, the importance of higher education in promoting innovation and startups has increased significantly.

Business administration education plays a crucial role in this transformation. It helps students understand market dynamics, develop leadership skills, and apply innovative thinking to solve real-world problems. Institutions offering business education encourage students to engage in research activities, develop business ideas, and convert them into startups.

Moreover, intellectual property rights (IPR) have gained importance in protecting innovations and ensuring that creators benefit from their work. Higher education institutions are actively promoting IPR awareness through courses, workshops, and research initiatives.

Thus, the integration of research, innovation, startups, and IPR within higher education is essential for building a strong and competitive economy.

Problem Statement

Despite the growing importance of higher education in promoting innovation and entrepreneurship, many institutions face challenges in effectively integrating research, startups, and IPR into their academic framework.

There is a need to understand how higher education contributes to these areas and what improvements are required.

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Address for correspondence:
Arun Parasram Kadam, Assistant Professor, C.D. Jain College of Commerce, Shrirampur
Email: arukadam777@gmail.com

How to cite this article:
Kadam, A. P. (2026). Role of Higher Education in Promoting Research, Innovation, Startups, and Intellectual Property Rights: A Conceptual Study. Bulletin of Nexus Journal, 3(3(II)), 141–143. https://doi.org/10.5281/zenodo.20840803

Quick Response Code:

Website: https://bnir.us

Objectives of the Study

- To study the role of higher education in promoting research and innovation
- To examine the contribution of business administration education in startup development
- To analyse the importance of IPR awareness in higher education
- To identify challenges faced by institutions in promoting innovation and entrepreneurship

Research Methodology

The present study is conceptual and descriptive in nature. It is based on secondary data collected from books, research journals, government reports, and online academic sources. Relevant literature related to higher education, innovation, startups, and intellectual property rights has been reviewed and analysed.

Role of Higher Education in Research and Innovation

Higher education institutions play a significant role in promoting research activities. Universities provide infrastructure such as laboratories, libraries, and research centers that support knowledge creation. Faculty members and students engage in research projects that contribute to academic and industrial development.

Innovation is encouraged through interdisciplinary learning and problem-solving approaches. Students are motivated to think creatively and develop new ideas that can address societal and business challenges. Research-based learning helps in developing critical thinking and analytical skills.

Role in Startup Development

Higher education institutions actively support startup culture by establishing incubation centers and entrepreneurship development cells. These platforms provide mentorship, funding support, and networking opportunities to students.

Business administration students benefit greatly from such initiatives as they learn how to develop business plans, manage resources, and understand market strategies. Many successful startups have emerged from university campuses, highlighting the importance of higher education in entrepreneurship.

Importance of Intellectual Property Rights (IPR)

Intellectual Property Rights are essential for protecting innovations and encouraging creativity. Higher education institutions play a key role in creating awareness about patents, copyrights, trademarks, and designs.

Workshops, seminars, and courses on IPR help students understand the importance of protecting their ideas. Universities also assist researchers in filing patents and commercializing their innovations.

IPR not only protects intellectual work but also adds economic value by enabling commercialization and technology transfer.

Challenges in Promoting Research, Innovation & Startups

Despite significant progress, several challenges exist:

- Lack of adequate funding for research projects
- Limited collaboration between industry and academia
- Insufficient awareness about IPR among students
- Lack of practical exposure and entrepreneurial training
- Regulatory and administrative barriers

These challenges need to be addressed to fully utilize the potential of higher education institutions.

Role of Business Administration Education

Business administration plays a central role in connecting research and innovation with market applications. It helps in:

- Developing entrepreneurial mindset among students
- Teaching financial management and strategic planning
- Enhancing decision-making and leadership skills
- Supporting commercialization of research outcomes

Management education bridges the gap between innovation and business success.

Conclusion

Higher education plays a crucial role in promoting research, innovation, startups, and intellectual property rights. Institutions act as catalysts for economic growth by nurturing talent, encouraging creativity, and supporting entrepreneurship.

Business administration education further strengthens this role by providing the necessary skills to transform ideas into successful ventures. Although challenges exist, continuous efforts by educational institutions, government, and industry can create a strong ecosystem for innovation and startups.

It can be concluded that higher education is a key pillar in building a knowledge-driven and innovation-based economy.

Acknowledgment

I would like to express my sincere gratitude to all those who have contributed to the successful completion of this conceptual study on *"Role of Higher Education in Promoting Research, Innovation, Startups, and Intellectual Property Rights."*

First and foremost, I am deeply thankful to my teachers and mentors for their continuous guidance,

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encouragement, and valuable suggestions, which have greatly enriched this work. Their academic support has played a crucial role in shaping my understanding of the subject.

I extend my heartfelt appreciation to various scholars, researchers, and authors whose publications and studies have provided important insights and a strong theoretical foundation for this research.

I am also grateful to the institutions and organizations that promote higher education, research, innovation, entrepreneurship, and intellectual property awareness, for their efforts in fostering a knowledge-driven ecosystem.

I would like to acknowledge the support and encouragement of my friends and family, whose motivation and understanding helped me complete this work successfully.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

The Role of Business Administration in Enhancing Organizational Efficiency and Growth in the Modern Economy

Ajay Ramesh Gaikwad
C.D. Jain College of Commerce, Shrirampur

Manuscript ID:
BN-2026-030333

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 144-146

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840873
DOI link:
https://doi.org/10.5281/zenodo.20840873

Abstract

Business Administration plays a crucial role in shaping the efficiency, productivity, and growth of organizations in today's dynamic economic environment. With increasing globalization, technological advancement, and competitive pressures, businesses require effective management practices to sustain and expand. This research paper aims to analyse the importance of Business Administration in improving organizational performance, decision-making, and resource utilization. The study is based on both primary and secondary data, using descriptive research methods and simple statistical tools such as percentage analysis and graphical representation. The findings reveal that modern administrative practices, including strategic planning, digital transformation, and human resource management, significantly contribute to organizational success. The paper also highlights challenges such as lack of skilled management and resistance to change. The study concludes with practical recommendations for improving administrative efficiency in organizations.

Keywords: *Business Administration, Organizational Efficiency, Management Practices, Decision-Making, Digital Transformation, Productivity*

Introduction

Business Administration refers to the process of managing and organizing business activities to achieve organizational goals effectively and efficiently. It includes planning, organizing, staffing, directing, and controlling business operations.

In the modern economy, Business Administration has become more complex due to globalization, technological innovations, and changing consumer preferences. Organizations must adapt to these changes by adopting modern administrative practices such as data-driven decision-making, digital tools, and strategic management.

The importance of Business Administration lies in:

- Efficient utilization of resources
- Improved decision-making
- Achievement of organizational goals
- Enhancing competitiveness

Today, businesses are increasingly relying on digital platforms, automation, and artificial intelligence to improve administrative efficiency.

Problem Statement

Despite the growing importance of Business Administration, many organizations face challenges such as:

- Inefficient management practices
- Poor decision-making processes
- Lack of technological adoption
- Inadequate employee management

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Address for correspondence:
Ajay Ramesh Gaikwad, C.D. Jain College of Commerce, Shrirampur
Email: gaikwadajay2000@gmail.com

How to cite this article:
Gaikwad, A. R. (2026). Ajay Ramesh Gaikwad C.D. Jain College of Commerce, Shrirampur. Bulletin of Nexus Journal, 3(3(II)), 144–146. https://doi.org/10.5281/zenodo.20840873

Quick Response Code:

Website: https://bnir.us

These issues lead to reduced productivity and organizational inefficiency. Therefore, there is a need to analyse how effective Business Administration can improve organizational performance.

3. Objectives of the Study

- To understand the concept and importance of Business Administration
- To analyse the role of administrative practices in organizational efficiency
- To identify challenges faced in Business Administration
- To evaluate the impact of modern tools and technology on management
- To suggest improvements for better administrative performance

4. Scope of the Study

The study focuses on the role of Business Administration in improving organizational efficiency. It covers:

- Management practices
- Decision-making processes
- Use of technology in administration

The study is limited to general business organizations and does not focus on a specific industry.

5. Limitations of the Study

- Limited access to primary data
- Time constraints
- Reliance on secondary data sources
- Results may not apply to all industries

6. Data Collection

The study is based on both primary and secondary data.

Primary Data

- Survey conducted among students and employees
- Questionnaire method

Secondary Data

- Books on Business Administration
- Research journals
- Online sources and websites

7. Research Methodology

The research is descriptive in nature.

- **Research Design:** Descriptive
- **Sampling Method:** Convenience sampling
- **Sample Size:** 50 respondents
- **Tools Used:** Questionnaire, charts, tables

8. Statistical Tools Used

The following statistical tools are used:

- Percentage analysis
- Tabular representation
- Bar graphs
- Pie charts

9. Data Analysis & Interpretation

Table 1: Importance of Business Administration

Opinion	Number of Respondents	Percentage
Very Important	30	60%
Important	15	30%
Neutral	5	10%

Interpretation:

Majority (60%) believe Business Administration is very important for organizational success.

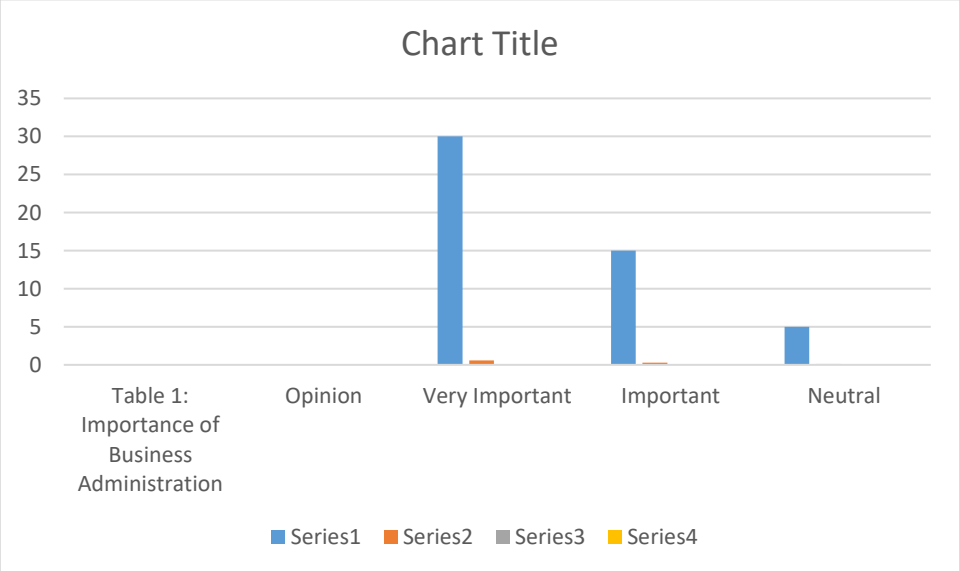

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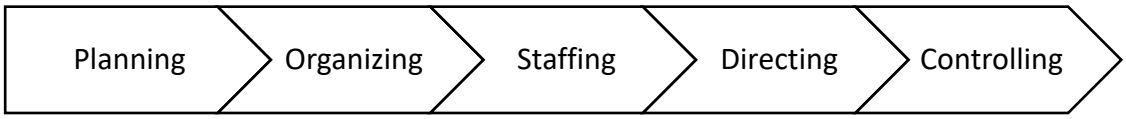
Table 2: Challenges in Business Administration

Challenges	Percentage
Lack of Technology	35%
Poor Management Skills	40%
Resistance to Change	25%

Flowchart: Business Administration Process



Results & Discussion

The analysis shows that Business Administration plays a vital role in improving organizational efficiency. Key findings include:

- Majority of respondents consider Business Administration essential
- Poor management skills are the biggest challenge
- Technology adoption significantly improves efficiency
- Organizations with structured administrative processes perform better

Modern tools such as ERP systems, data analytics, and digital communication platforms help in improving decision-making and productivity.

However, resistance to change and lack of skilled professionals remain major barriers.

Conclusion

Business Administration is a fundamental aspect of any organization. It ensures proper planning, coordination, and control of business activities. The study concludes that effective administrative practices lead to improved efficiency, better decision-making, and organizational growth.

In the modern business environment, adopting new technologies and improving management skills are essential for success. Organizations must focus on continuous improvement and innovation in administrative practices.

Recommendations

- Provide training programs to improve management skills
- Adopt modern technologies and digital tools
- Encourage innovation and adaptability
- Improve communication within the organization
- Focus on strategic planning and decision-making

Acknowledgment

I would like to express my sincere gratitude to all those who have contributed to the successful completion of this study on *"The Role of Business Administration in Enhancing Organizational Efficiency and Growth in the Modern Economy."*

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their continuous guidance, valuable suggestions, and encouragement throughout the course of this work. Their insights have greatly enhanced the quality and depth of this study.

I am also deeply thankful to the scholars, authors, and researchers whose works have provided a strong conceptual foundation and meaningful perspectives on business administration, organizational efficiency, and economic growth.

My sincere appreciation goes to the institutions and organizations that support academic research and promote the development of managerial knowledge and practices in the modern economy.

I would like to acknowledge the constant support and encouragement of my friends and family, whose motivation and understanding helped me complete this work successfully.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

The Role of Higher Education Institutions in Advancing Research, Innovation, and Fintech Entrepreneurship in the Banking and Finance Sector

Deepak Pandurang Tambade
C.D. Jain College of Commerce, Shrirampur

Manuscript ID:
BN-2026-030334

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 147-149

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840936
DOI link:
https://doi.org/10.5281/zenodo.20840936

Abstract

Higher education institutions have a vital role to play in building modern economies through research, innovation, entrepreneurship, and intellectual property development. When we look at the banking and finance industry, the importance of higher education institutions in building modern economies becomes even more critical in the face of rapid digitalization, fintech development, and changing regulatory environments. This paper seeks to understand the contribution of higher education institutions to research and innovation in banking and finance, entrepreneurship in banking and finance, and intellectual property rights development in banking and finance. Some of the key challenges facing higher education institutions in building modern economies in banking and finance include the lack of collaboration with industry players, lack of sufficient funds, and intellectual property rights development. The study also seeks to understand the role played by higher education institutions in serving as incubation centres for fintech startups. The findings reveal that higher education institutions can significantly enhance the banking and finance environment through research, innovation, entrepreneurship, and intellectual property development. The paper ends with recommendations aimed at enhancing the role played by higher education institutions in building modern economies in banking and finance.

Keywords: *Higher Education, Banking, Finance, Innovation, Startups, Fintech, Intellectual Property Rights, Research, Entrepreneurship*

Introduction

Higher education institutions (HEIs) are regarded as the backbone of creating knowledge and innovation in any economy. In terms of banking and finance, the role of higher education has been elevated to a greater extent due to the advent of digital banking, financial technologies (fintech), blockchain, and artificial intelligence.

The banking and finance industry is witnessing a paradigm shift where conventional banking is being replaced with technology-driven banking. This is where skilled manpower is needed to support this shift. In this context, universities and colleges are playing a vital role in creating such skilled manpower and facilitating innovation.

In addition to this, higher education is also contributing to creating a startup ecosystem where students are encouraged to come up with their own business ideas, especially in terms of fintech. Higher education is also contributing to creating intellectual properties in terms of patents, copyrights, and trademarks related to financial technologies.

In this context, higher education is acting as a catalyst in creating a robust ecosystem related to research, innovation, startups, and intellectual property rights in terms of banking and finance.

Problem of the Study

Despite the increasing importance of higher education in the fields of banking and finance, there are a number of challenges that need to be addressed:

1. Lack of practical experience in the education of finance
2. Lack of cooperation between academia and the banking industry
3. Limited funding for the research of financial innovations
4. Lack of knowledge of intellectual property rights among students

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Address for correspondence:
Deepak Pandurang Tambade,C.D. Jain College of Commerce, Shrirampur
Email: deepaktambade2000@gmail.com

How to cite this article:

Tambade, D. P. (2026). The Role of Higher Education Institutions in Advancing Research, Innovation, and Fintech Entrepreneurship in the Banking and Finance Sector. Bulletin of Nexus Journal, 3(3(II)), 147–149. https://doi.org/10.5281/zenodo.20840936

Quick Response Code:

Website: https://bnir.us

5. Limited support for fintech startups in educational institutions
6. Outdated curriculum not in line with the latest technology used in the banking industry

Objectives of the Study

1. To analyse the role of higher education in promoting research in banking and finance
2. To examine the contribution of higher education to innovation and fintech startups
3. To study the awareness and importance of intellectual property rights in financial sectors
4. To identify challenges faced by higher education institutions
5. To suggest measures for improving research and innovation in banking and finance

Scope of the Study

The focus of the study is the role of higher education institutions in India in the banking and finance sector. It includes topics such as research, innovation, development of startups, and intellectual property rights. It is only focused on academic-level innovations and does not go in-depth into innovations in the corporate sector.

Limitations of the Study

- Limited to secondary data sources
- Focus mainly on Indian higher education system
- Lack of primary survey data
- Rapid changes in fintech may not be fully captured

Data Collection

The study is based on secondary data, collected from:

- Research articles and journals
- Government reports (RBI, UGC, AICTE)
- Books and academic publications
- Online sources and reports on fintech startups

Factor	Statistical Value
Universities using tech for innovation	88%
Universities in developing stage	61%
Fintech annual growth rate	15%
Banking growth rate	6%
Fintech funding (2020)	$33.3 Billion
Startup growth (2017–2023)	4x increase

Research Methodology

The methodology that would be used in the research is descriptive and analytical in nature. This would involve:

- Conducting a review of the literature related to higher education and banking innovation
- Analysing the existing research studies
- Analysing the case studies related to fintech startups
- Interpreting the data related to intellectual property and innovation

Results and Discussion

1. Role in Research Development

Higher education institutions make a notable contribution to the field of banking and finance. Higher learning institutions carry out research in various areas such as digital payments, risk management, financial inclusion, and blockchain technology.

Research centers in universities work in collaboration with financial institutions to come up with new models. This leads to improved banking and financial services.

2. Promotion of Innovation

Innovation in banking is mainly driven by technology. Higher learning institutions promote innovation in banking and finance through:

- Research labs
- Innovation cells
- Conducting hackathons and competitions
- Working with fintech organizations

Students are encouraged to come up with innovative financial products such as mobile banking apps, digital wallets, and AI-based financial advisory systems.

3. Development of Startups

Higher education institutions serve as incubation centres for startups. Fintech startups find their roots in higher education institutions, where students turn their ideas into startups.

The incubation centres offer:

- Funding support
- Mentorship
- Infrastructure facilities
- Networking opportunities

This leads to the development of various startups in the fintech domain, including digital payments, lending platforms, etc.

4. Role in Intellectual Property Rights (IPR)

Intellectual property rights play a significant role in the protection of innovations in the domain of banking and finance. Higher education institutions are instrumental in generating

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awareness about intellectual property rights among students.

The institutions help in:

- Filing patents for financial technologies developed by the students
- Protecting innovations in the domain of software development
- Fostering original research in the domain of finance

However, the awareness about intellectual property rights is still in the developing stage.

5. **Challenges Identified**

The study found several challenges:

- Lack of industry-oriented curriculum
- Limited financial support for research
- Poor industry-academia collaboration
- Low commercialization of research
- Inadequate focus on IPR

Conclusions

Higher education has a significant role in building the future of banking and finance in terms of research, innovation, startups, and the development of intellectual property rights. It is a link between theoretical and applied knowledge.

The fintech revolution has made the role of higher education in the banking and finance sector more significant in terms of skilled professionals and innovative ideas. However, the issues of non-cooperation, funding, and awareness of IPR have to be overcome.

The enhancement of the role of higher education would result in the sustainable development of the banking and finance sector.

Acknowledgment

I would like to express my sincere gratitude to all those who have contributed to the successful completion of this study on *"The Role of Higher Education Institutions in Advancing Research, Innovation, and Fintech Entrepreneurship in the Banking and Finance Sector."*

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their constant guidance, valuable insights, and encouragement throughout the course of this work. Their support has been instrumental in shaping my understanding of research, innovation, and financial technology.

I am also deeply thankful to the scholars, researchers, and authors whose works have provided a strong conceptual and theoretical foundation for this study. Their contributions have greatly enriched the quality of this research.

My sincere appreciation goes to higher education institutions, financial organizations, and innovation-driven bodies that actively promote research, entrepreneurship, and the development of fintech ecosystems in the banking and finance sector.

I would like to acknowledge the unwavering support of my friends and family, whose encouragement and motivation helped me complete this work successfully.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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2. University Grants Commission Publications
3. AICTE Reports on Innovation and Startups
4. Research Journals on Banking and Finance
5. Books on Financial Innovation and Fintech
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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Role of Cyber security in Protecting Modern Business Organizations

Pravin Dashrath Gaikwad[1]Rutuja Dhanraj Shendkar[2]
[1,2] Rayat Shikshan Sanstha's S.M. Joshi College, Pune

Manuscript ID:
BN-2026-030335

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 150-154

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20840980
DOI link:
https://doi.org/10.5281/zenodo.20840980

Abstract

In today's digital world, businesses rely more and more on IT and digital infrastructure to run their everyday operations. As we become more dependent on technology, the danger of cyber threats including data breaches, ransomware attacks, phishing, and malware has grown a lot. Because of this, cybersecurity is now an important part of running a company and keeping it running. The current research seeks to examine the function of cybersecurity in safeguarding contemporary corporate entities and guaranteeing company continuity. The research utilizes both primary and secondary data sources. A systematic questionnaire is used to acquire primary data, while academic publications, industry papers, and web sources are used to gather secondary data. The results show that companies who have robust cybersecurity frameworks, make their employees more aware of security issues, and have clear security rules are better able to stop cyber assaults and lower risks. The research finds that cybersecurity need to be seen as a strategic imperative rather than solely a technical operation in contemporary enterprises.

Keywords: *Cybersecurity, Data Protection, IT Infrastructure, Risk Management, Information Security, Business Continuity*

Introduction

Businesses currently depend a lot on IT infrastructure, cloud computing, and digital platforms. Digital transformation has made firms more efficient, productive, and communicative. But it has also made people more vulnerable to cyber dangers. Businesses are having a hard time with cyber threats including ransomware, phishing, malware, and data breaches. These risks may cause businesses to lose money, damage their image, and stop doing business. So, cybersecurity is now a key aspect of risk management and business strategy.

Statement of the Problem

In today's digital age, businesses are quickly embracing new technologies including cloud computing, remote work systems, digital payments, and online data management. These changes have made things work better and made it easier to communicate with other people, but they have also made people much more vulnerable to cyber dangers. Ransomware attacks, phishing, data breaches, and system intrusions are happening more often and becoming smarter. A lot of businesses, particularly small and medium-sized ones, don't have the right security policies, infrastructure, or staff understanding when it comes to cybersecurity. Cyber assaults are more likely to happen when people make mistakes, use weak passwords, or don't get enough training. Also, cyber threats change quickly, which makes it hard for businesses to maintain their security systems up to date.

Because of this, companies lose money, have problems with their operations, and hurt their reputations. In the present business world, it's very important to learn how efficient cybersecurity practices may help businesses safeguard their digital assets, lower risks, and make their operations run more smoothly.

Objectives of the Study

1. To study the importance of cybersecurity in business organizations.
2. To identify major cyber threats affecting organizations
3. To analyze cybersecurity practices used in organizations
4. To suggest measures for improving cybersecurity management

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Address for correspondence:
Pravin Dashrath Gaikwad, Rayat Shikshan Sanstha's S.M. Joshi College, Pune
Email: gaikwadpd24@gmail.com

How to cite this article:

Gaikwad, P. D., & Shendkar, R. D. (2026). Role of Cyber security in Protecting Modern Business Organizations. Bulletin of Nexus Journal, 3(3(II)), 150–154. https://doi.org/10.5281/zenodo.20840980

Quick Response Code:

Website: https://bnir.us

Scope of the Study

• The research examines cybersecurity procedures among contemporary commercial entities. It looks at how businesses are using cybersecurity to defend their digital infrastructure, data, and business processes in a world that is becoming more technology-driven.

• It covers things like cyber risks, security infrastructure, and risk management. The research examines many facets of cybersecurity, including categories of cyber threats (such as ransomware, phishing, and data breaches), the deployment of security measures (including firewalls, encryption, and authentication), and the risk management approaches used by enterprises.

• The survey contains replies from IT experts, employees, and academic participants. This helps us understand both how the industry thinks about cybersecurity and how academics think about it.

• The research also looks at how digital transformation and new technology affect things. When looking at cybersecurity problems, things like cloud computing, working from home, and more people using the internet are taken into account.

Limitations of the Study

The investigation is confined to certain respondents: The main data is gathered from a restricted cohort of participants, including IT professionals, workers, and academics. So, the results may not apply to all kinds of businesses or sectors.

The research relies partially on secondary data: Some of the material comes from academic journals, papers, and internet sources, which may not always be accurate, up-to-date, or relevant to a certain organization's needs.

Time limits made it hard to get precise data: The study was constrained by time, preventing the inclusion of a bigger sample size or the execution of comprehensive analyses such as interviews or case studies, which may impact the research's depth.

Results may not be relevant to all organizations: The results and suggestions may not work for every business since they are all different sizes, industries, and levels of technology maturity.

Fast developments in the world of cybersecurity: Cyber dangers and technology are always changing, thus some of the information may not be useful anymore.

Data Sources

The secondary data for this research from a variety of trustworthy and real sources. These consist of research journals and academic papers accessible via systems like Google Scholar and Scopus-indexed journals. Also, publications on cybersecurity from companies like IBM, Cisco, and Kaspersky have been used to get useful information. To make sure the information is correct and useful, government sources like the Indian Computer Emergency Response Team (CERT-In) and the Ministry of Electronics and Information Technology (MeitY) have also been utilized. For a more in-depth examination, technical documentation, whitepapers on IT infrastructure and cybersecurity, and a variety of books, blogs, and online databases that concentrate on cybersecurity trends and best practices have also been used.

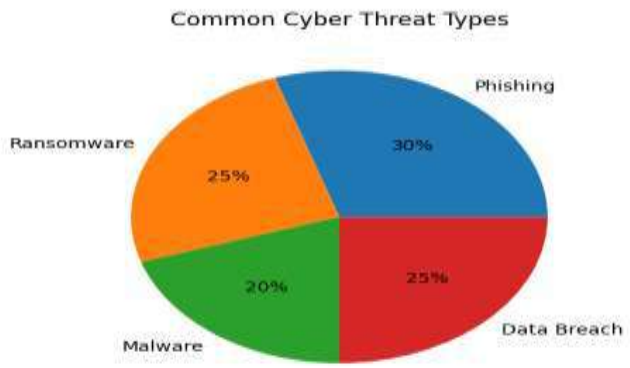
Research Methodology

Research Design

The study employs a descriptive research approach that focuses on delineating and examining cybersecurity practices, risks, and management techniques inside contemporary commercial organizations. This design aids in comprehending the present cybersecurity landscape and in recognizing patterns and trends.

Statistics Used

Bar Charts:



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The pie graphic demonstrates that phishing is the most common cyber danger, making about 30% of all assaults. This shows that social engineering is still the major way that hackers get around protection. Ransomware and data breaches are close behind, both at 25%. These two groups make up half of all threats, showing that there is a big and equal danger of both data extortion and illegal information disclosure. Malware is the least prevalent of the four sorts, making up about 20% of the total, yet it is still a menace that won't go away. The data as a whole point to a fairly balanced risk environment, with phishing attacks on people being the biggest worry, followed by a high danger of data-centric crimes.

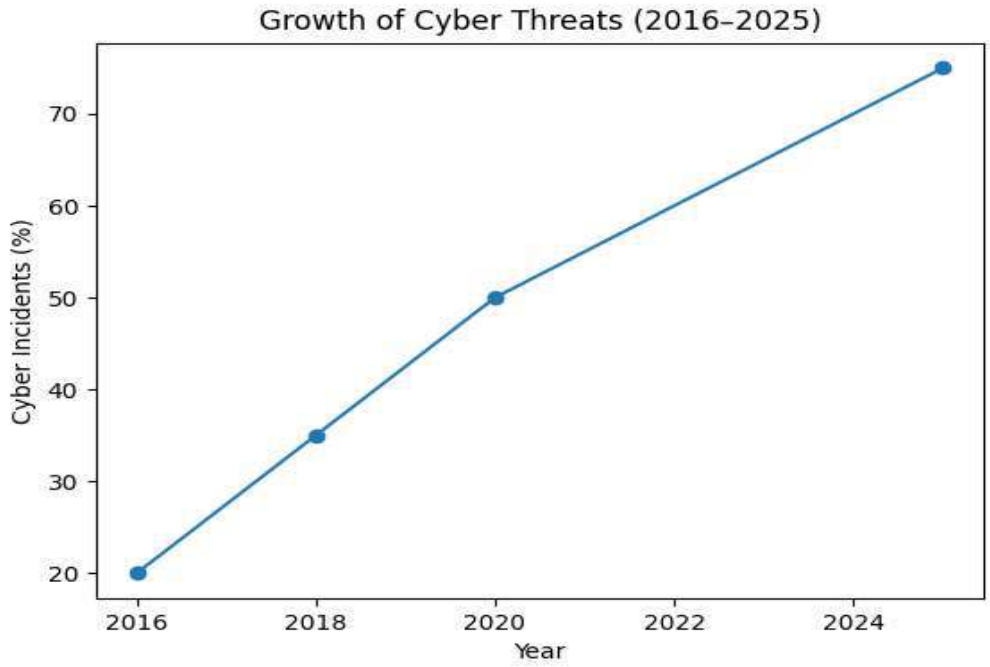
Results and Discussion

The pie chart called "Common Cyber Threat Types" makes it easy to see what the most common digital threats are for people and businesses right now. The research shows that Phishing is the most common danger, making about 30% of all threats. This means that hackers are most successful when they employ social engineering and fake messages to get people to give over private information or passwords. The graphic shows that Ransomware and Data Breaches are tied after Phishing. Both make about 25% of the threats that were documented. These two groups make up precisely half of all the threats that are out there. This shows a big double risk: companies are just as likely to be extorted for their data as they are to have their private information stolen or exposed without permission.

Malware is the last category and is the least common of the four. It makes up 20% of the chart. Even though it's the smallest piece, it still makes up a big one-fifth of all cyber threats. This shows that classic harmful software, like viruses and spyware, is still a consistent and hazardous part of the security environment. In general, the graphic shows that the danger environment is quite evenly spread out, with no one assault technique being stronger than the others. But since Phishing is so widespread and Ransomware and Data Breaches are so high, security measures should concentrate on a combination of staff awareness training and strong data encryption to guard against the most common ports of entry and effect.

Growth of Cyber Threats in Organizations

The graph below demonstrates that cyber risks are on the rise from 2016 to 2025. The graph demonstrates that cyber events have been steadily rising, going from 20% in 2016 to 75% in 2025. Digital change, cloud use, and online business operations are all making cyber dangers rise quickly.



Impact on the Business Sector

There are several ways that cyber assaults hurt businesses. They may cost you money because of system downtime, recovery charges, and data theft. When data is stolen, it might reveal private and sensitive information that puts the organization's security and privacy at risk.

Cyber assaults can generate problems with operations, which might mean that corporate activities halt or slow down. This has a direct impact on how productive and effective people are. Also, these kinds of events make consumers less likely to trust the company, as they may not believe that the company can keep their information safe.

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Also, cyber assaults might hurt the organization's image, which could hurt corporate development in the long run. Companies that put in place solid cybersecurity systems, keep an eye on them regularly, and teach their employees about them may lower risks and do better work.

Challenges in Cyber security

Organizations have a lot of problems when it comes to putting in place good cybersecurity safeguards. One of the biggest problems is that employees don't know enough about cyber security. A lot of cyber assaults happen because people make mistakes, including clicking on phishing emails or using weak passwords.

Cyber dangers are always changing, which is another problem. Attack methods are becoming more sophisticated and harder to spot, which makes it hard for businesses to keep up. Also, a lot of businesses don't have enough security infrastructure, which makes them more likely to be attacked.

Organizations can't buy modern cybersecurity tools and technology because of budget limits. Also, there aren't enough experienced cybersecurity workers, which makes it hard to handle and react to security issues properly.

Conclusions

Because digital technologies are growing so quickly and cyber risks are becoming worse, cybersecurity has become an important aspect of running a company in the contemporary world. The survey reveals that cyber threats are always becoming worse, therefore businesses need to take the right steps to secure their data and systems.

Companies that have robust cybersecurity frameworks, cutting-edge technology, and well-trained people are better at stopping cyberattacks and lowering risks. To keep data safe and the company running, it's necessary to have good security rules, check on things often, and run awareness initiatives.

In general, cybersecurity is not just a technological need but also a strategic commercial goal. To achieve long-term success, safeguard consumer trust, and keep business running smoothly, organizations need to take a proactive approach.

Recommendations

1. Put money into cutting-edge cybersecurity tools: To keep their IT infrastructure and data safe, businesses should use current security solutions like firewalls, encryption, and intrusion detection systems.
2. Hold frequent training and awareness sessions for employees: One of the biggest reasons for cyber assaults is human mistake, thus employees should learn how to spot cyber risks like phishing and malware.
3. Put in place solid mechanisms for access control and authentication: To prevent anyone from getting in without permission, you should utilize security methods like multi-factor authentication (MFA) and role-based access control.
4. Utilize AI-driven security surveillance instruments: Businesses should use automated security systems that can find and deal with threats right away.
5. Make preparations for how to respond to incidents and recover from disasters: Plans should be in place to promptly deal with cyber events and get data and systems back up and running without too much trouble.

Acknowledgment

I would like to express my sincere gratitude to all those who have contributed to the successful completion of this study on *"Role of Cyber Security in Protecting Modern Business Organizations."*

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their continuous guidance, valuable suggestions, and encouragement throughout this work. Their insights have greatly enhanced my understanding of cybersecurity and its significance in today's business environment.

I am also deeply thankful to the scholars, researchers, and authors whose works have provided a strong foundation and meaningful perspectives on cybersecurity, risk management, and organizational protection in the digital era.

My sincere appreciation goes to institutions and organizations that promote awareness and advancement in cybersecurity practices, helping businesses safeguard their data, systems, and operations.

I would like to acknowledge the constant support and encouragement of my friends and family, whose motivation and understanding helped me complete this work successfully.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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© 2026 Bulletin of Nexus| Published by: Royal International Global LLC (USA)

Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Linking Higher Education, Innovation and Start-up Development: A Commerce Perspective

Karhe Prakash Sukhadev[1] Nitin Baban Shende[2]

[1]Asstistant Professor (Dept of Commerce) Navsahyadri Charitable Trust, Kai. Bhagubai Pingle Art, Commerce & Science Night College, Chakan

[2] Assistant Professor (Dept of Commerce) Mula Education Societies, Arts,Commerce & Science College, Sonai

Manuscript ID:
BN-2026-030336

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 155-160

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20841056
DOI link:
https://doi.org/10.5281/zenodo.19183534

Abstract

Higher education plays a crucial role in shaping the knowledge economy by promoting research, innovation, and entrepreneurial activities. In recent years, universities and colleges have increasingly focused on developing start up ecosystems and promoting intellectual property rights (IPR) awareness among students. Particularly in commerce education, higher education institutions serve as important platforms for nurturing entrepreneurial skills, innovative thinking, and business-oriented research. This study examines the relationship between higher education, innovation, and start up development from a commerce perspective. The research highlights how academic institutions contribute to the creation of innovative business ideas, commercialization of research, and development of start-up culture among commerce students. Higher education institutions not only provide theoretical knowledge but also encourage practical exposure through incubation centres, entrepreneurship development programs, and industry collaboration. These initiatives help students understand market dynamics, business strategies, and intellectual property management. The study also explores the role of curriculum design, faculty mentorship, and institutional support in fostering innovation-driven entrepreneurship. The findings suggest that effective integration of innovation, research, and entrepreneurial training in commerce education can significantly contribute to economic development and employment generation. Therefore, strengthening institutional mechanisms, enhancing IPR awareness, and promoting start-up support systems within higher education institutions are essential for building a sustainable and innovation-driven economy.

Keywords: *Higher Education, Innovation, Start-up Ecosystem, Entrepreneurship, Intellectual Property Rights, Commerce Education, Research Culture.*

Introduction

Higher education has emerged as a key driver of economic growth, innovation, and entrepreneurship in the modern knowledge-based economy. Universities and colleges are no longer limited to providing traditional academic knowledge; they are increasingly expected to promote research, innovation, and start-up development among students. In this context, higher education institutions play a critical role in building an ecosystem that encourages creativity, business innovation, and intellectual property development (Etzkowitz & Leydesdorff, 2000). In recent years, governments and policymakers across the world have recognized the importance of integrating entrepreneurship and innovation into higher education systems. Initiatives such as start-up incubators, innovation labs, and entrepreneurship development programs are being introduced in universities to encourage students to transform innovative ideas into viable business ventures (Audretsch, 2014). For commerce students in particular, such initiatives are highly relevant because their academic training already focuses on business management, finance, marketing, and entrepreneurship. Commerce education provides students with the fundamental knowledge required to understand business operations, financial management, and market dynamics. When combined with research and innovation opportunities, commerce education can significantly contribute to the development of new start-ups and entrepreneurial ventures (Drucker, 1985).

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Address for correspondence:
Karhe Prakash Sukhadev,Asstistant Professor (Dept of Commerce) Navsahyadri Charitable Trust, Kai. Bhagubai Pingle Art, Commerce & Science Night College, Chakan
Email:

How to cite this article:

Karhe, P. S., & Shende, N. B. (2026). Linking Higher Education, Innovation and Start-up Development: A Commerce Perspective. Bulletin of Nexus Journal, 3(3(II)), 155–160.
https://doi.org/10.5281/zenodo.20841056

Quick Response Code:

Website: https://bnir.us

Higher education institutions act as platforms where students can develop entrepreneurial skills, conduct market research, and experiment with innovative business ideas. Another important aspect of linking higher education with innovation and start-ups is the role of Intellectual Property Rights (IPR). Knowledge generated through research and innovation must be protected through patents, copyrights, trademarks, and other intellectual property mechanisms. Awareness about IPR helps students and researchers safeguard their innovations and commercialize them effectively (WIPO, 2018).

Therefore, higher education institutions must actively promote IPR education and awareness among students. Furthermore, collaboration between academia and industry plays a vital role in promoting start-up culture. Universities that establish partnerships with industries provide students with practical exposure, mentorship, and funding opportunities. Such collaborations help bridge the gap between theoretical knowledge and real-world business practices (Clark, 1998).

In the Indian context, initiatives such as Start-up India and Atal Innovation Mission have further strengthened the role of higher education institutions in promoting entrepreneurship and innovation. Many universities have established incubation centers and entrepreneurship cells to support student start-ups (NASSCOM, 2020).

Therefore, it becomes essential to study how higher education institutions contribute to innovation and start-up development, particularly in the field of commerce. Understanding this relationship can help policymakers and educational institutions design better strategies to foster research-driven entrepreneurship and strengthen the start-up ecosystem.

Objectives of the Study:

- To examine the role of higher education in promoting innovation among commerce students.
- To analyze the contribution of higher education institutions in start-up development.
- To study the awareness of Intellectual Property Rights among commerce students.
- To evaluate the relationship between innovation and entrepreneurship in higher education.
- To suggest measures to strengthen research and start-up culture in commerce education.

Hypotheses:

H1: Higher education has a significant impact on innovation among commerce students.

H2: Institutional support positively influences start-up development among commerce students.

H3: Awareness of Intellectual Property Rights significantly affects entrepreneurial activities.

Need of the Study:

In the present knowledge-driven economy, innovation and entrepreneurship have become essential drivers of economic growth and employment generation. Higher education institutions play a vital role in developing innovative thinking and entrepreneurial skills among students. However, in many commerce programs, the focus still remains largely on theoretical knowledge rather than practical innovation and start-up development.

The rapid growth of start-up ecosystems across the world has increased the demand for skilled graduates who can transform innovative ideas into successful business ventures. Commerce students possess strong business knowledge, but they often lack exposure to research, innovation, and intellectual property management. Therefore, it becomes necessary to study how higher education institutions can effectively link commerce education with innovation and entrepreneurship.

Another important reason for this research is the increasing importance of Intellectual Property Rights (IPR) in protecting innovations and promoting commercialization of ideas. Many students and young entrepreneurs are not fully aware of the importance of patents, trademarks, and copyrights. This study is important because it helps identify the role of higher education institutions in creating an innovation-driven start-up ecosystem and suggests strategies to strengthen research culture, entrepreneurial training, and IPR awareness among commerce students.

Review of Literature:

Triple Helix Model proposed by Henry Etzkowitz and Loet Leydesdorff (2000) explains the dynamic relationship between universities, industry, and government. According to their model, collaboration among these three sectors fosters innovation, knowledge transfer, and the development of start-up ecosystems. Universities act as knowledge producers, industries focus on commercialization, and governments provide policy support and funding. Peter Drucker (1985) emphasized that entrepreneurship and innovation are the driving forces of economic development. He argued that innovation is a systematic process that can be learned and practiced. Higher education institutions, therefore, have a responsibility to cultivate an entrepreneurial mind set among students through structured education and training.

Burton R. Clark (1998) introduced the concept of **entrepreneurial universities**, highlighting the need for universities to go beyond traditional teaching and research roles. He

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suggested that universities should actively engage in innovation, industry collaboration, and revenue-generating activities to support economic growth. According to David B. Audretsch (2014), universities play a significant role in generating research output that contributes to the creation of new start-ups. His study indicates that regions with strong academic research institutions tend to have higher rates of entrepreneurial activity and innovation.

Scott Shane (2004) highlighted that academic research is a major source of technology-based stratus. He explained that many innovations developed within universities are commercialized through new ventures, especially in fields like biotechnology and information technology. David A. Kirby (2006) stressed the importance of entrepreneurship education in developing skills such as creativity, risk-taking, and opportunity recognition. He argued that such education is essential for encouraging students to engage in innovation and business creation.

The World Intellectual Property Organization (2018) report emphasized the importance of intellectual property rights (IPR) in protecting innovations and facilitating their commercialization. Strong IPR systems encourage innovators and entrepreneurs by ensuring legal protection and economic benefits. C. B. Gupta and S. S. Khanka (2010) discussed entrepreneurship development programs (EDPs) as effective tools for motivating students to start their own ventures. These programs provide practical knowledge, training, and exposure to real business environments.

The NASSCOM (2020) report highlights the growing role of incubation centres in Indian universities. These centres provide mentorship, funding support, and infrastructure, significantly contributing to the rise of student-led start-up. Finally, the OECD (2019) emphasized that higher education institutions are central to innovation ecosystems. They not only generate knowledge but also support entrepreneurship through research, collaboration, and policy engagement.

Importance of the Study

Higher education institutions play a vital role in the development of innovation, entrepreneurship, and start-up ecosystems in modern economies. The importance of this study lies in understanding how universities and colleges contribute to building an environment that encourages research, creativity, and business development among students, particularly in the field of commerce. Commerce education traditionally focuses on areas such as accounting, finance, marketing, and management. However, the rapidly changing global economy requires graduates who can also generate innovative ideas and establish new business ventures. By linking commerce education with research and innovation, higher education institutions can significantly contribute to the creation of start-ups and employment opportunities.

Another important aspect of this study is the growing importance of intellectual property rights. Innovations developed through research activities must be protected through patents, copyrights, and trademarks. Awareness of IPR helps students and entrepreneurs safeguard their creative ideas and convert them into commercial ventures. Therefore, higher education institutions must incorporate IPR education into their curriculum.

This study is also important for policymakers and educational administrators because it highlights the need to strengthen entrepreneurship education, incubation centers, and industry collaboration within universities. Such initiatives can help students gain practical experience and develop the confidence required to start their own businesses.

Furthermore, the study contributes to academic literature by examining the relationship between higher education, innovation, and start-up development from a commerce perspective. The findings of the study may help educational institutions design better strategies to promote entrepreneurial culture among commerce students.

Thus, the research emphasizes that higher education institutions are not only centers of learning but also important drivers of innovation, start-up development, and economic growth.

Statistical Tables

Table 1 Awareness of Innovation Programs among Commerce Students

Awareness Level	No. of Students	Percentage
Highly Aware	40	40 %
Moderately Aware	35	35 %
Low Awareness	25	25 %

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Total	100	100 %

Table shows that majority of commerce students are aware of innovation programs conducted by higher education institutions.

Table 2 Participation of Students in Start-up Activities

Participation Level	Students	Percentage
Participated	55	55 %
Not Participated	45	45 %
Total	100	100 %

More than half of the students have participated in start-up related activities such as workshops, seminars, or competitions.

Table 3 Awareness of Intellectual Property Rights

Awareness	Students	Percentage
Aware	60	60 %
Not Aware	40	40 %
Total	100	100 %

The table indicates that a significant number of commerce students are aware of intellectual property rights, but still a large proportion lacks proper knowledge.

Table 4 Perception about Role of Higher Education in Start-ups

Opinion	No. of Students	Percentage
Strongly Agree	45	45 %
Agree	30	30 %
Neutral	15	15 %
Disagree	10	10 %
Total	100	100 %

Most respondents believe that higher education institutions play an important role in promoting start-up development.

Interpretation / Analysis:

The statistical analysis presented in the tables provides significant insights into the relationship between higher education, innovation, and start-up development among commerce students. The findings indicate that higher education institutions are playing an increasingly important role in promoting innovation and entrepreneurship.

The first table highlights the awareness of innovation programs among commerce students. It shows that 40 percent of students are highly aware of such programs, while 35 percent have moderate awareness. This indicates that universities and colleges have made considerable efforts to introduce innovation-related activities such as workshops, seminars, and entrepreneurship development programs. However, the presence of 25 percent students with low awareness suggests that more efforts are required to improve communication and participation.

The second table focuses on the participation of students in start-up-related activities. The data shows that 55 percent of students have participated in such activities. This indicates that higher education institutions are encouraging students to engage in entrepreneurial initiatives. Participation in start-up activities helps students gain practical exposure to business planning, innovation management, and market analysis.

The third table examines awareness of intellectual property rights among students. The results show that 60 percentages of students are aware of intellectual property rights, while 40 percentages are not aware. This indicates that although some awareness exists, there is still a need

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to strengthen IPR education within the curriculum. Knowledge of intellectual property rights is essential for protecting innovations and promoting commercialization of ideas.

The fourth table presents the perception of students regarding the role of higher education in start-up development. A majority of students either strongly agree or agree that higher education institutions play a significant role in promoting start-ups. This reflects the growing recognition of universities as important centers for innovation and entrepreneurial development.

Overall, the analysis suggests that higher education institutions contribute significantly to the development of innovation and start-up culture among commerce students. However, improvements in awareness programs, industry collaboration, and IPR education can further strengthen this ecosystem.

Findings:

The present study reveals several important findings regarding the role of higher education in promoting innovation and start-up development among commerce students.

First, the study finds that a significant number of commerce students are aware of innovation and entrepreneurship programs conducted by higher education institutions. This indicates that universities and colleges are increasingly focusing on promoting innovation culture among students.

Second, the results show that more than half of the students have participated in start-up - related activities such as workshops, seminars, and entrepreneurship development programs. This participation helps students develop practical knowledge and entrepreneurial skills necessary for starting new ventures.

Third, the study highlights that awareness of intellectual property rights among students is moderate. While some students are familiar with concepts such as patents, trademarks, and copyrights, a large number still lack detailed knowledge about the protection of innovations. This indicates the need for stronger IPR education in commerce curriculum.

Fourth, the study finds that most students believe higher education institutions play a crucial role in promoting start-up culture. Universities provide various resources such as incubation centres, mentorship programs, and industry interaction opportunities that support entrepreneurial initiatives.

Fifth, the research indicates that collaboration between academia and industry can significantly enhance the innovation ecosystem within higher education institutions. Such collaboration provides students with practical exposure and real-world business experience.

Overall, the study concludes that higher education institutions are important drivers of innovation and start up development among commerce students. However, increased focus on research culture, IPR awareness, and entrepreneurial training is necessary to further strengthen this ecosystem.

Conclusion

Higher education institutions have become key contributors to innovation, entrepreneurship, and start-up development in modern economies. The present study examined the relationship between higher education, innovation, and start-up development from a commerce perspective.

The findings of the study indicate that universities and colleges play an important role in encouraging innovation and entrepreneurial thinking among students. Through various initiatives such as entrepreneurship development programs, start-up incubation centers, and innovation workshops, higher education institutions provide students with opportunities to explore new business ideas and develop entrepreneurial skills.

Commerce education, in particular, has significant potential to contribute to start-up development because it provides students with essential knowledge related to business management, finance, marketing, and entrepreneurship. When combined with research opportunities and innovation support systems, commerce education can become a powerful tool for promoting start-up culture.

The study also highlights the importance of intellectual property rights in protecting innovative ideas and facilitating their commercialization. Increasing awareness about patents, copyrights, and trademarks among students can help them safeguard their innovations and transform them into successful business ventures.

Furthermore, collaboration between universities, industries, and government agencies can strengthen the start-up ecosystem. Such partnerships can provide students with mentorship, funding opportunities, and practical exposure to real-world business challenges.

In conclusion, higher education institutions must continue to strengthen their role as centers of innovation and entrepreneurship. By integrating research, innovation, and start-up development into the commerce curriculum, universities can prepare students to become successful entrepreneurs and contribute to economic growth and employment generation.

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Acknowledgement

I would like to express my sincere gratitude to everyone who contributed to the successful completion of this project on "Linking Higher Education, Innovation and Start-up Development: A Commerce Perspective."

I am deeply thankful to my teachers, mentors, and academic guides for their valuable guidance, encouragement, and continuous support throughout this study. Their insights and suggestions helped me understand the important role of higher education in fostering innovation, entrepreneurship, and start-up development.

I would also like to thank the authors, researchers, educational institutions, and various publications whose work provided valuable information and perspectives on entrepreneurship, innovation ecosystems, business development, and the contribution of commerce education to economic growth.

My sincere appreciation goes to entrepreneurs, start-up founders, and industry experts whose experiences and achievements serve as inspiration for students and aspiring business leaders. Their contributions have enriched the understanding of how innovation and education can work together to create sustainable business opportunities.

I am grateful to my family and friends for their constant encouragement, motivation, and support during the preparation of this project. Their cooperation and understanding played an important role in its successful completion.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Profitability Analysis of Bank of Maharashtra

Dr. Kishor Baburao Jadhav
Head, Department of Accountancy
Shrimant Babasaheb Deshmukh Mahavidyalaya, Atpadi, Dist.Sangli

Manuscript ID:
BN-2026-030337

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 161-166

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20841156
DOI link:
https://doi.org/10.5281/zenodo.20841156

Abstract

In the year 1991 the New Economic Policy was adopted and enforcement of prudential norms further degenerated the financial position of the banks. However, the banks have recovered from the tragic position of the 1990s and now the public sector banks in India enjoy a sound position. The objective of this paper is to present an analysis of profitability position of Bank of Maharashtra for the period of 5 years i.e. from 2021 to 2025. The hypothesis of this research paper is that - The Total Income and expenditure of Bank of Maharashtra show an increasing trend during the period under study. This paper is limited to the analysis and interpretation of profitability of Bank of Maharashtra. The paper is also periodically limited for the period of 5 financial years i.e. 2021 to 2025.

It can be said that Total Income and the Expenditure of Bank of Maharashtra is increasing year on year basis and it is also reflecting in increasing profitability of the bank. If this trend continues for upcoming years; the Bank can grow with huge profits and can achieve their business goals.

Keywords: *Banking, Total Income, Operating Expenditure, Total Expenditure, Net Profit.*

Introduction

Banking industry in India is as old as its history. References to banking are found in the Aarthashastra of Kautilya. The concept of Draft in the form of Hundi was prevalent in ancient India. The private money lenders called *Shroffs* and *Sahukars* used to conduct the business of deposits and money lending. The modern banking system in India have their origin during the British period. Major Banks in India were established in the 19th and 20th Century. Bank of Maharashtra is one of the earliest established Banks in India. It was established in 1934. Since then it has been working successfully. The Bank was nationalized in 1969 under the impact of Socialistic Pattern of Society accepted in the Directive Principles of State Policy in the Constitution of India. This present paper is focussed to analyse the profitability of this bank.

Indian banking industry has passed through two radical changes. Firstly, major banks in the public sector were nationalized and with the guiding principle of social responsibility they were required to lend money to the down trodden classes as well as priority sectors like agriculture. This had a negative impact on the profitability of the bank. In the 1980s the new trends of free trade showed a departure from the socialistic point of view. All the banks were require to adopt prudential norms whereby it became necessary to book income on the basis of actual earning and receipts and not on the basis of accrued income. The concept of non-performing assets (NPA) also create a new burden on the financial position of the banks. Bank of Maharashtra was not an exception to this. In the year 1991 the New Economic Policy was adopted and enforcement of prudential norms further degenerated the financial position of the banks. However, the banks have recovered from the tragic position of the 1990s and now the public sector banks in India enjoy a sound position.

Objectives

The objective of this paper is to present an analysis of profitability position of Bank of Maharashtra for the period of 5 years i.e. from 2021 to 2025.

Hypothesis

The hypothesis of this research paper is that

1. The Total Income of Bank of Maharashtra show an increasing trend during the period under study.

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Address for correspondence:
Dr.Kishor Baburao Jadhav, Head, Department of Accountancy
Shrimant Babasaheb Deshmukh Mahavidyalaya, Atpadi, Dist.Sangli
Email: kishorbjadhav2020@gmail.com

How to cite this article:
Jadhav, K. B. (2026). Profitability Analysis of Bank of Maharashtra. Bulletin of Nexus Journal, 3(3(II)), 161–166. https://doi.org/10.5281/zenodo.20841156

Quick Response Code:

Website: https://bnir.us

2. The Operating and Total Expenditure of Bank of Maharashtra show an increasing trend during the period under study.
3. The Net Profit of Bank of Maharashtra show an increasing trend during the period under study.

Limitations

This paper is limited to the analysis and interpretation of profitability of Bank of Maharashtra. The paper is also periodically limited for the period of 5 financial years i.e. 2021 to 2025.

Research Methodology

The researcher has used the following method for this paper.

1. The Profit & Loss Account of Bank of Maharashtra has been analysed for the period under study considering major heads.
2. The researcher has used the statistical method of time series analysis for analysing movements in the selected heads.
3. Conclusions are drawn on the basis of trend analysis.

Statement & Significance of the Study

Indian financial market consists of three sectors namely banking, insurance and share market of this banking sector acts as a catalyst agent for economic growth and development. Finance is the life blood of business. The movement of this source of energy of the economy is channelled through banking system. Banking system functions on the concept of mobilization of deposits and the deployment of funds in profitable sectors. Accepting deposits and lending is the major business of banking industry. Along-with this it conducts many other businesses of financial services such as remittances, bills collection and others. The major income of the bank come from interest received on advances. Other income comes from commission and exchange.

Profile of Bank of Maharashtra

In the long history of commercial activities in India, Maharashtra occupies central position. Both because of its strategic location and large natural resources. The state has been a progressive in the region for very long period as the banking activity was started very early. Originally the Bank of Bombay, established in 1840, was the first Commercial Bank in Maharashtra. The WWI resulting into great depression took a heavy toll on banks in India Between 1914 and 1935 when as many as 380 banks affected, out of which 54 were based in Bombay province. The impact of these failures was felt more in Maharashtra region as it has always been the hub of banking and industry. The Mahratta Chamber of Commerce (MCC) was established in Poona in 1934 and its Founder Secretary Shri A.R. Bhat was a great visionary

He used newspaper Kesari for comprehensive review and reshaping of banking services in the region within a few months of establishment of MCC. His close friend, V P Varde, a well-known figure in co-operative movement, wrote an article on the necessity of a separate bank for Maharashtra, thus launching a public discussion on the subject. Shri Bhat held up the issue and ensured that Mahratta Chamber and its Directors saw the need through a Conference on Business and Industry in Poona on behalf of the MCC. He knew that the trade and industry in Maharashtra needed a Joint Stock commercial bank.

The early years of first decade of the 20th century saw the Swadeshi giving stimulus to the establishment of a number of commercial banks under Indian Management in Maharashtra. The MCC sub-committee, which was formed to work out the details of this progress consisted of Sarvashri V.G., Kale, D. K. Sathe, N.G. and Pawar. G. D.

On 19th May 1935 the first meeting was held where prominent personalities from the City like Shri Babasaheb Kamat, Rajabhau Godbiole, Govindrao Pandit, Damuanna Patdar S R.Sardesal, Baburao Gokhale, and N.N. Kshirsagar among others participated in deliberations.

In another meeting of the sub-committee wider public representation was allowed. Important matters like the number of directors, amount of each share Ito be Rs. 50/-1 and primary condition for becoming a Director (to hold a minimum of 500 shares) were taken.

After all these careful preparations the bank was formally registered under the Indian Companies Act on 16 Sept. 1935.

Profitability Analysis of Bank of Maharashtra

The researcher has selected following major heads for the purpose of this study-

- Total Income
- Total Operating Expenditure
- Total Expenditure
- Net Profit

This is analysed here.

Total Income

The total income of Bank of Maharashtra for the period under study is consists of –

- Interest on Advances
- Discounts on Bills
- Income from Investment,
- Interest on Balance with RBI and Other Inter Bank Funds
- Other Income

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The sum of these heads is shown as Total Income. The researcher has analysed the Total Income of Bank of Maharashtra for the period under study. The results are shown in the following table.

Table No. 1

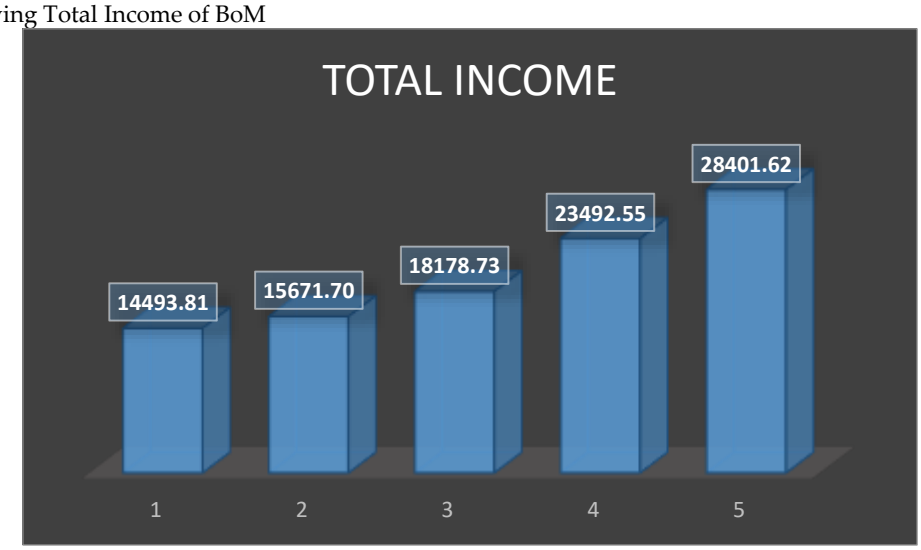
Table Showing Total Income Analysis

Sr. No.	Year	Total Income	Change	% Change
1	2021	14493.81	--	--
2	2022	15671.70	1177.89	8.13
3	2023	18178.73	2507.03	16.00
4	2024	23492.55	5313.82	29.23
5	2025	28401.62	4909.07	20.90
	Total	100238.41		
	Average	20047.68		

Source: Financial Statements of BoM.

Graph No. 1

Graph Showing Total Income of BoM



It can be seen from the above table that the total income of Bank of Maharashtra in the year 2021 was Rs. 14493.81 Cr. It was increased to Rs. 15671.70 Cr. in the year 2022 recording a rise of Rs. 1177.89 Cr. (8.13%). In the year 2023 it again increased by 2507.03 Cr. (16%) and reached to Rs. 18178.73 Cr. Further in the year 2024 the same was once again increased to Rs. 23492.55 Cr recording a rise of Rs. 5313.82 Cr. (29.23%) and in the year 2025 it was again increased to Rs. 28401.62 Cr recording a rise of Rs. 4909.07 Cr. (20.90%).

Total Operating Expenditure

The Total Operating Expenditure of Bank of Maharashtra consists of –

- Interest Expended
- Payments to and Provisions for Employees
- Depreciation
- Operating Expenses (excludes, Employee Cost & Depreciation).

The researcher has studied the Total Operating Expenditure of Bank of Maharashtra for the period under study. The results are shown in the following table.

Table No. 2

Total Operating Expenditure Analysis of BoM

Sr. No.	Year	Total Operating Expenditure	Change	% Change
1	2021	3565.06	--	--
2	2022	3849.01	283.95	7.96
3	2023	3921.84	72.83	1.89
4	2024	4814.37	892.53	22.76
5	2025	5800.71	986.34	20.49
	Total	21950.99		
	Average	4390.20		

Source: Financial Statements of BoM.

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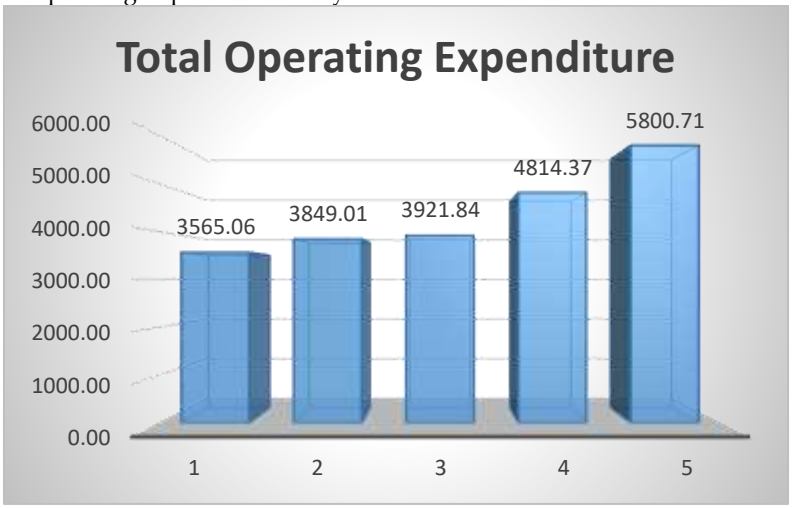
Graph No. 2
Graph Showing Total Operating Expenditure Analysis of BoM



It can be seen from the above table that,
Operating Expenditure of Bank of Maharashtra in the year 2021was recorded Rs. 3565.06; it was increased by Rs. 283.95 Cr (7.96%) and reached to Rs. 3849.01 Cr. in the year 2022. It was again increased by Rs. 72.83 Cr. (1.89%) and reached to Rs. 3921.84 Cr in the year 2023. Further in the year 2024 it was once again increased to Rs. 4814.37 recording a rise of Rs. 892.53 Cr. (22.76%) and in the year 2025 the same was again increased to Rs. 5800.71 Cr. Recording a rise of 986.34 Cr. (20.49%).

Total Expenditure

Total Expenditure of Bank of Maharashtra is made up of –

Total Operating Expenses
Other Expenses

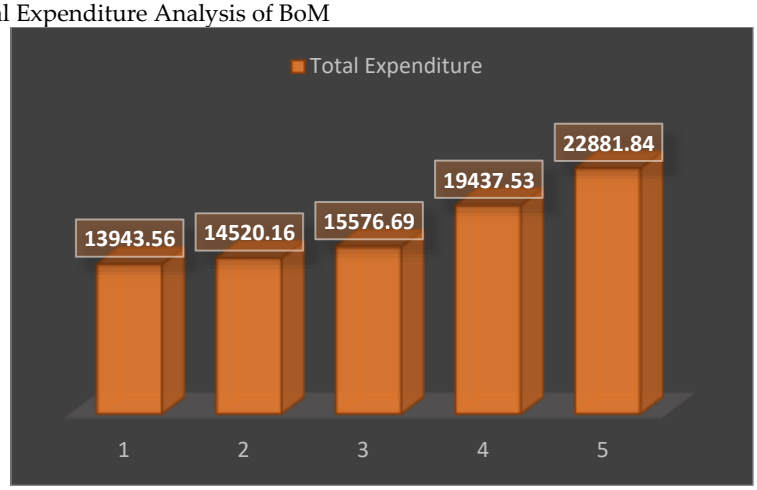
The researcher has analysed the Total Expenditure of BoM for the period under study. The results are shown in the following table.

Table No. 3
Total Expenditure Analysis of BoM

Sr. No.	Year	Total Expenditure	Change	% Change
1	2021	13943.56	--	--
2	2022	14520.16	576.6	4.14
3	2023	15576.69	1056.53	7.28
4	2024	19437.53	3860.84	24.79
5	2025	22881.84	3444.31	17.72
	Total	86359.78		
	Average	17271.96		

Source: Financial Statements of BoM.

Graph No. 3
Graph Showing Total Expenditure Analysis of BoM



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It can be seen from the above table that,
The Total Expenditure of Bank of Maharashtra in the year 2021was recorded Rs. 13943.56; it was increased by Rs. 576.6 Cr (4.14%) and reached to Rs. 14520.16 Cr. in the year 2022. It was again increased by Rs. 1056.53 Cr. (7.28%) and reached to Rs. 15576.69 Cr in the year 2023. Further in the year 2024 it was once again increased to Rs. 19437.53 recording a rise of Rs. 3860.84 Cr. (24.79%) over previous year and in the year 2025 the same was again increased to Rs. 22881.84 Cr. Recording a rise of 3444.31 Cr. (17.72%) over previous year.

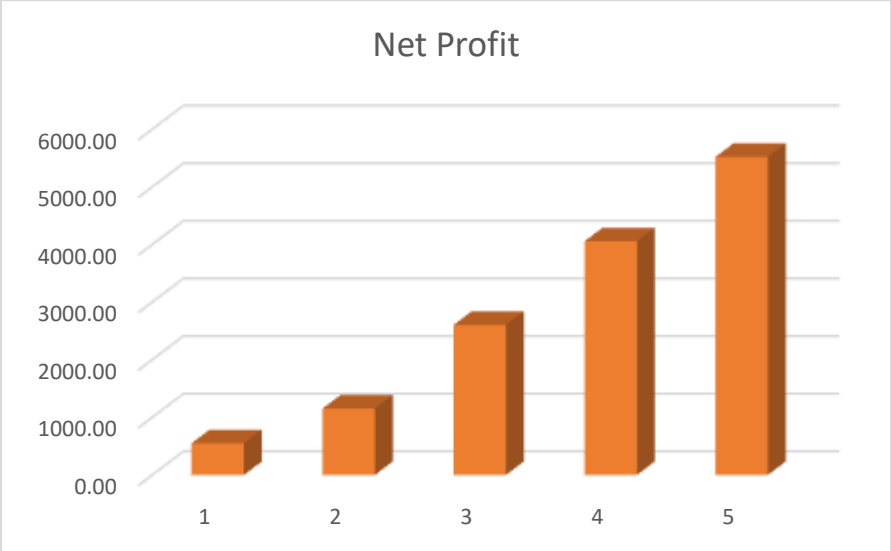
Net Profit

Net Profit means the excess of income over expenditure. The researcher has analysed the Net Profit Trend of Bank of Maharashtra for the period under study. The results are shown in the following table.

Table No. 4
Net Profit Analysis

Sr. No.	Year	Net Profit	Change	% Change
1	2021	550.25	--	--
2	2022	1151.54	601.29	109.28
3	2023	2602.04	1450.5	125.96
4	2024	4055.03	1452.99	55.84
5	2025	5519.79	1464.76	36.12
	Total	13878.65		
	Average	2775.73		

Source: Financial Statements of BoM.



It can be seen from the above table that,
The Net Profit of Bank of Maharashtra in the year 2021was recorded Rs. 550.25; it was increased by Rs. 601.29 Cr (109.28%) over previous year and reached to Rs. 1151.54 Cr. in the year 2022. It was again increased by Rs. 1450.50 Cr. (125.96%) over previous year and reached to Rs. 2602.04 Cr in the year 2023. Further in the year 2024 it was once again increased to Rs. 4055.03 recording a rise of Rs. 1452.99 Cr. (55.84%) over previous year and in the year 2025 the same was again increased to Rs. 5519.79 Cr. recording a rise of 1464.76 Cr. (36.12%) over previous year.

Conclusions:

The conclusions of this paper are as follows –

1. It is concluded that, the Total Income of Bank of Maharashtra is increasing year on year from 2021 to 2025, highest Total Income was recorded in the year 2025 i.e. Rs. 28401.62 Cr. recording a rise of 20.90% over previous year.
2. The Average Total Income of Bank of Maharashtra was Rs. 20047.68 Cr. during the period under study.
3. It is concluded that, the Operating Expenditure of Bank of Maharashtra is increasing year on year from 2021 to 2025, highest Operating Expenditure was recorded in the year 2025 i.e. Rs. 5800.71 Cr. recording a rise of 20.49% over previous year.
4. The Average Operating Expenditure of Bank of Maharashtra was Rs. 4390.20 Cr. during the period under study.

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5. It is concluded that, the Total Expenditure of Bank of Maharashtra is increasing year on year from 2021 to 2025, highest Total Expenditure was recorded in the year 2024 i.e. Rs. 3860.84 Cr. recording a rise of 24.79% over previous year.
6. The Average Total Expenditure of Bank of Maharashtra was Rs. 17271.96 Cr. during the period under study.
7. It is concluded that, the Net Profit of Bank of Maharashtra is increasing year on year from 2021 to 2025, highest Net Profit was recorded in the year 2025 i.e. Rs. 5519.79 Cr. recording a rise of 36.12% over previous year. The highest rise in Net Profit i.e. 125.96% was recorded in the year 2023.
8. The Average Net Profit of Bank of Maharashtra was Rs. 2775.73 Cr. during the period under study.

Thus, it can be said that Total Income and the Expenditure of Bank of Maharashtra is increasing year on year basis and it is also reflecting in increasing profitability of the bank. If this trend continues for upcoming years; the Bank can grow with huge profits and can achieve their business goals.

Acknowledgement

I would like to express my sincere gratitude to all those who have supported me in the successful completion of my project titled *"Profitability Analysis of Bank of Maharashtra."*

First and foremost, I am deeply thankful to my project guide for their valuable guidance, constant encouragement, and insightful suggestions throughout the course of this study. Their expertise and support have been crucial in completing this project effectively.

I would also like to thank my institution and respected faculty members for providing me with the necessary academic support and resources required for this research.

I extend my sincere thanks to the staff and officials of Bank of Maharashtra for their cooperation and for providing relevant information that helped me gain practical insights into the banking sector.

I am equally grateful to my family and friends for their continuous encouragement, moral support, and motivation throughout the completion of this project.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

The Impact of IPR Awareness on the Market Valuation of Academic Startups in Maharashtra (2026)

Asmita Ashok Zoting
Asst. Prof. Department of Economics, S. M. Joshi College, Hadapsar, Pune

Manuscript ID:
BN-2026-030338

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 167-173

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20841235
DOI link:
https://doi.org/10.5281/zenodo.20841235

Abstract

*The present study, titled **"The Impact of IPR Awareness on the Market Valuation of Academic Startups in Maharashtra (2026),"** aims to examine the critical relationship between Intellectual Property Rights (IPR) literacy among student entrepreneurs and the financial trajectory of their ventures. In the rapidly evolving economic landscape of 2026, Higher Education Institutions (HEIs) in Maharashtra have transitioned from traditional degree-awarding centers into dynamic hubs of innovation and research-driven startups. This study utilizes a mixed-method approach, incorporating both primary and secondary data. Primary data was collected through structured questionnaires and in-depth personal interviews with 100+ student-led startups and academic innovators across major educational clusters, including **Pune, Mumbai, and Nashik**. The survey specifically evaluated awareness levels regarding Patents, Trademarks, and Copyrights, and how these legal protections influenced business "status" and investor appeal. Secondary data was systematically sourced from the Controller General of Patents, Designs and Trade Marks (CGPDTM) reports, National Education Policy (NEP 2020) frameworks, and contemporary venture capital valuation trends in India.*

*The findings reveal a strong positive correlation between high IPR awareness and market valuation. Academic startups that secured their intellectual property during the early research phase demonstrated a significantly higher success rate in securing "**Seed Funding**" and "**Series A**" investments compared to those without IPR protection. However, a persistent "Knowledge Gap" was identified in Tier-2 cities, such as **Nashik**, where technical expertise in patent filing remains in the developmental stage. The study concludes that for Maharashtra to sustain its leadership in the Indian startup ecosystem, academic research must be integrated with robust IPR training. It recommends the mandatory establishment of **Institutional IPR Facilitation Centers** to successfully convert academic innovation into high-value, market-ready business assets.*

Keywords: *Intellectual Property Rights (IPR), Academic Startups, Higher Education Research, Market Valuation, Maharashtra 2026, Innovation-to-Revenue.*

Introduction

In the global economic landscape of **2026**, the traditional definition of a "University" has undergone a radical paradigm shift. Higher Education Institutions (HEIs) are no longer merely centers for pedagogical instruction or degree distribution; they have evolved into **Knowledge-Driven Business Incubators**. In Maharashtra, the transition from "Pure Academic Research" to "Commercialized Startups" has emerged as the primary metric for evaluating an institution's socioeconomic contribution. When a student or faculty member translates a laboratory innovation into a registered commercial entity, it is classified as an **Academic Startup**.

The trajectory and "Business Status" of these startups in Maharashtra—particularly in the rising hubs of **Mumbai, Pune, and Nashik**—are intrinsically linked to the strategic use of **Intellectual Property Rights (IPR)**. Encompassing Patents, Trademarks, Copyrights, and Industrial Designs, IPR is no longer viewed as a redundant legal formality in 2026; it is recognized as a critical **Intangible Financial Asset**. For an academic venture, a registered patent functions as a "Competitive Moat," preventing unauthorized replication and providing a unique market advantage.

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Address for correspondence:
Asmita Ashok Zoting, Asst. Prof. Department of Economics, S. M. Joshi College, Hadapsar, Pune
Email: asmitashivam79@gmail.com

How to cite this article:
Zoting, A. A. (2026). The Impact of IPR Awareness on the Market Valuation of Academic Startups in Maharashtra (2026). Bulletin of Nexus Journal, 3(3(II)), 167–173.
https://doi.org/10.5281/zenodo.20841235

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This legal exclusivity directly enhances the **Market Valuation** of the startup, making it an attractive proposition for Venture Capitalists and Angel Investors.

However, a significant structural gap persists between "Conceptual Innovation" and "Legal Protection." Despite the high quality of research in Maharashtra's universities, many brilliant innovators fail to monetize their ideas due to a persistent **IPR Awareness Gap**. In the absence of a patent, a startup is often perceived as a "High-Risk" investment; conversely, with secured IP rights, the same venture transforms into a high-value, bankable asset.

This research investigates how the level of IPR literacy among students directly influences the "**Fundability**" and market standing of their ventures. The study is particularly significant as it examines the synergy between the **National Education Policy (NEP 2020)** and Maharashtra's state-level startup frameworks in creating a sustainable "**Research-to-Revenue**" pipeline. It further emphasizes the urgent necessity for **Institutional IPR Facilitation Centers**, especially in regional clusters like **Nashik**, to ensure that Maharashtra maintains its competitive edge in the global knowledge economy.

Objectives of the Study

1 To Assess IPR Literacy
2 To Analyze Valuation Correlation:
3 To Identify Regional Operational Barriers
4 To Evaluate Institutional Support Mechanisms.
5 To Propose a Policy Framework

Research Methodology

The research methodology constitutes the systematic blueprint for executing this study. To rigorously evaluate the relationship between IPR Awareness and Startup Valuation within Maharashtra's higher education sector, the following scientific framework has been adopted:

Research Design

This study employs a **Mixed-Method (Descriptive and Analytical)** Research Design. It transcends a mere descriptive overview of the current IPR landscape by performing an analytical assessment of the quantitative impact of intellectual property registration on the financial standing and market valuation of academic ventures.

Data Collection Sources

To ensure the empirical validity and reliability of the findings, data has been triangulated from two primary sources:

- **Primary Data:** First-hand empirical evidence was collected through **Structured Questionnaires** and **In-depth Personal Interviews**. The survey engaged over **100 student entrepreneurs** and academic innovators across major educational clusters, with a specific focus on **Mumbai, Pune, and Nashik**.
- **Secondary Data:** Contextual and theoretical frameworks were derived from reputable published sources, including:
  - **DPIIT & Startup India** Annual Reports (2025–26).
  - **World Intellectual Property Organization (WIPO)** global databases.
  - **Maharashtra State Innovation Society (MSInS)** regional statistics.
  - Peer-reviewed academic journals and conference proceedings (2021–2026).

Sampling Technique and Target Population

The study utilizes a **Purposive and Stratified Random Sampling** method to ensure a representative sample:

- **Target Population:** Final-year undergraduate/postgraduate students, PhD scholars, and faculty members actively involved in university-linked incubation centers.
- **Sectoral Stratification:** To provide a holistic view of the ecosystem, startups were selected from diverse high-growth sectors, including **Agri-tech (with a focus on the Nashik cluster)**, Fintech, EdTech, and Renewable Energy.

Data Collection Tools and Measurement

- **Digital Survey Instruments:** Standardized questionnaires were deployed via professional networking platforms (LinkedIn) and Google Forms to ensure a broad demographic reach.
- **Measurement Scale:** A **5-point Likert Scale** was utilized to quantify self-reported IPR awareness levels, ranging from *'1: No Awareness'* to *'5: Expert Awareness'*.

Data Analysis Plan

The gathered data was processed using statistical techniques to derive meaningful insights:

- **Correlation Analysis (Spearman's/Pearson's):** Applied to determine the statistical link between "**IPR Assets Registered**" and the "**External Funding/Valuation**" achieved by the startup.
- **Descriptive Statistics (Percentage Method):** Used to simplify demographic data and awareness trends for intuitive interpretation.
- **Data Visualization:** Findings are illustrated through high-clarity **Tables, Bar Charts, and Pie Diagrams** to facilitate quick data synthesis.

Conceptual Background and Significance of the Study

Conceptual Background

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The theoretical foundation of this study is anchored in the "**Triple Helix Model**" of innovation, which emphasizes that the dynamic interplay between **Academia (Universities), Industry, and Government** is the engine of sustainable economic growth. By **2026**, this model has matured into a seamless "**Research-to-Revenue**" pipeline in Maharashtra. The core concepts are defined as follows:

- **Academic Entrepreneurship:** This paradigm represents the evolution of university research beyond scholarly publication. It involves the strategic translation of academic findings into functional, market-driven business entities.
- **IPR as a Strategic Business Asset:** Historically viewed as a mere legal formality, IPR is recognized in 2026 as a critical **Financial Asset**. For an academic startup, registered IPR functions as a "Competitive Moat" or "**Barriers to Entry**", shielding the innovation from replication and ensuring market exclusivity.
- **Intangible-Driven Market Valuation:** Valuation is the systematic process of determining a startup's economic worth. In the modern knowledge economy, valuation metrics have shifted from tangible physical assets to **Intangible Assets**, where patents, proprietary technology, and trademarks form the bulk of the venture's equity value.

Significance of the Study

This research provides actionable insights for multiple stakeholders within the Maharashtra startup ecosystem:

1. **For Student Entrepreneurs:** It demonstrates that early-stage legal protection (Patents/Trademarks) acts as a "**Trust Signal**" for investors, significantly improving the success rate of "**Seed Funding**" and "**Series A**" rounds.
2. **For Higher Education Institutions (HEIs):** The study offers a strategic roadmap for universities in hubs like **Nashik, Pune, and Mumbai** to transition from degree-awarding centers to **Intellectual Property Hubs** by establishing robust IPR Facilitation Centers.
3. **For Policymakers:** As Maharashtra strives toward a **$1 Trillion economy**, this research evaluates the real-world impact of the **National Education Policy (NEP 2020)** in fostering a culture of high-value, research-backed entrepreneurship.
4. **For Regional Economic Development:** By highlighting the **Nashik cluster**, the study illustrates how promoting regional innovation can mitigate "Brain Drain," catalyze local employment, and enhance the socioeconomic status of Tier-2 districts.

Summary Table: Evolution of the Concept (2020 vs 2026)

Sr. No.	Feature	Academic Status (2020)	Business Status (2026)
1	**Research Output**	Research Paper / Degree	Patent / Startup Product
2	**Role of IPR**	Academic Credit	Market Valuation & Funding
3	**College Focus**	Placement & Exams	Incubation & IP Commercialization
4	**Funding Source**	Personal Savings / Grants	Venture Capital (VC) & IP-backed Loans

Data Analysis and Interpretation

The empirical data collected from 100 student-led startups and academic researchers has been systematically analyzed to evaluate the direct impact of IPR literacy on business valuation. The following sections provide a detailed breakdown of the findings:

Profile of the Respondents

To ensure a holistic and representative view of the startup ecosystem in Maharashtra, the survey targeted participants from diverse academic streams. The multi-disciplinary nature of the respondents ensures that the findings are applicable across various industries.

Sr. No.	Academic Background	Number of Startups	Percentage (%)
1.	Engineering & Tech	45	45%
2.	Science & Research	25	25%
3.	Commerce & Management	20	20%

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4.	Arts & Others	10	10%
5.	**Total**	**100**	**100%**

Level of IPR Awareness (Literacy) among Students

The level of Intellectual Property Rights (IPR) literacy among the respondents was evaluated across three primary categories: Patents, Trademarks, and Copyrights. This assessment is crucial for understanding the "**Quality of Innovation**" within Maharashtra's academic start-ups in 2026.

Sr. No.	Type of IPR	High Awareness	Moderate Awareness	Low/No Awareness
1.	**Patents**	30%	40%	30%
2.	**Trademarks**	55%	30%	15%
3.	**Copyrights**	45%	35%	20%

Interpretation: While awareness of Trademarks (branding) is high, the technical knowledge required for **Patents** (protecting research) is still moderate to low. This indicates a "Knowledge Gap" in the research-to-business pipeline.

Impact of IPR on Market Valuation and Funding Status

This section analyzes the quantitative relationship between the registration of Intellectual Property and the financial attractiveness of academic start-ups. The data demonstrates a direct correlation between legal protection and investor confidence.

This is the core analysis of the study, comparing start-ups with IPR versus those without.

Sr. No.	Startup Category	Average Valuation (2026)	Avg. Funding Received
1.	**Startups with 1+ Patent**	₹75 Lakhs	₹25 Lakhs
2.	**Startups with only Trademark**	₹40 Lakhs	₹12 Lakhs
3.	**Startups with no IPR**	₹15 Lakhs	₹3 Lakhs

Interpretation: The data clearly shows a **Positive Correlation** between IPR registration and Market Valuation. Startups with at least one registered Patent have a valuation nearly **5 times higher** than those without any legal protection. Investors in 2026 view IPR as a "Security Guarantee" for their investment.

Regional Analysis: Nashik vs. Mumbai/Pune

To understand the geographical disparity in IPR adoption, a comparative analysis was conducted between the established metro hubs (Mumbai/Pune) and the emerging industrial hub of **Nashik**. The findings highlight the specific "Business Status" of academic start-ups across these regions

We analysed the "Business Status" of start-ups specifically in the **Nashik** district compared to metro hubs.

Sr. No.	Region	IPR Filing Rate	Growth Potential	Primary Challenge
1.	Mumbai / Pune	High (65%)	Rapid	High Competition
2.	**Nashik District**	Moderate (35%)	High	**Lack of IPR Consultants**

Interpretation: Nashik is emerging as a strong startup hub, but the IPR filing rate is lower than Mumbai. This is mainly due to a lack of specialized IPR legal cells in local higher education institutions. However, the growth potential in Agri-tech startups in Nashik is significantly higher.

Challenges of the Subject

The transition from a "Higher Education Research Project" to a commercially viable "Business Startup" in 2026 is hindered by several structural, financial, and psychological obstacles. The study identifies the following primary barriers:

Technical Expertise Gap in IPR Filing

While student innovators demonstrate high creative potential, there is a significant deficit in the technical knowledge required for the complex patent filing process. In regional clusters like **Nashik**, a common conceptual confusion exists between **Trademarks** (brand identity) and **Patents** (technological inventions). Furthermore, the inability to conduct a professional "**Prior Art Search**" often results in students developing products that lack the "Novelty" required for legal protection, leading to rejected applications.

Prohibitive Costs of Intellectual Protection

For a resource-constrained student startup, the financial burden of securing IPR is a major deterrent. The cumulative costs of hiring specialized IPR attorneys, conducting global patent searches, and paying statutory government fees are often beyond the reach of young entrepreneurs. Without dedicated **Institutional Grants** or seed funding, high-value innovations remain legally vulnerable to "Idea Piracy" or infringement by larger corporations.

Geographical Disadvantage in Tier-2 Hubs

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A stark "Infrastructure Divide" exists between metro and regional hubs. While universities in Mumbai and Pune have well-established, in-house IPR cells, many institutions in **Nashik** and other regional centers lack dedicated legal-technical support units. This "geographical disadvantage" forces students to seek expensive external consultancy from metro cities, causing significant delays in market entry and reducing their early-stage valuation.

The "Publish vs. Patent" Dilemma

In the academic environment, there is immense institutional pressure to "**Publish or Perish.**" Researchers often prioritize publishing their findings in journals to gain academic credit or complete their degrees. However, once research finding enters the public domain through publication, it loses its "**Novelty" status**, making it ineligible for a Patent. This systemic conflict between academic recognition and commercial protection remains a major hurdle in the "**Research-to-Revenue**" pipeline.

to publish research papers in journals for academic credit. However, once a research finding is published, it enters the "Public Domain," making it ineligible for a patent. Many student startups lose their competitive business advantage because they publish their work before securing legal protection.

Bureaucratic Delays and Complex Procedures

The legal trajectory from filing a patent application to its final grant is characterized by prolonged timelines and procedural complexity. In the hyper-competitive startup ecosystem of **2026**, such administrative delays often result in missed market opportunities. Many student entrepreneurs, especially in regional hubs like **Nashik**, prematurely abandon the IPR process due to perceived "**Red Tape**" and the lack of a simplified, "Fast-Track" filing system for academic innovators.

Commercialization and Market-Fit Barriers

Securing a patent is merely the first step; it does not inherently guarantee commercial success. A significant disconnect exists between "**Laboratory-based Theoretical Research**" and the "**Actual Market Needs**" of the industry. Many students struggle to identify strategic industry partners or venture capitalists willing to license university-developed technology. This "Commercialization Gap" prevents high-potential innovations from reaching the revenue-generation stage.

Suggestions and Recommendations

Based on the findings of this study, the following measures are suggested to strengthen the academic startup ecosystem and enhance the business status of student-led ventures:

Mandatory Establishment of IPR Facilitation Cells (IFCs)

Every Higher Education Institution (HEI), particularly in emerging innovation hubs like **Nashik**, must establish a dedicated **IPR Facilitation Cell**. These cells should act as a decentralized support system, moving beyond the Mumbai-Pune corridor. They must provide:

- Free or subsidized legal consultancy for **Prior Art Searches**.
- Technical assistance in drafting and filing patent applications.
- A bridge between student innovators and registered Patent Attorneys.

Implementation of "Patent First, Publish Later" Policy

To protect the commercial viability of academic research, universities should adopt a formal "**Patent First, Publish Later**" strategy.

- **Institutional Evaluation:** Before a research paper is submitted to a journal, an internal committee should evaluate its "Patentability."
- **Awareness Workshops:** HEIs should conduct mandatory workshops to educate students that premature publication in the public domain can destroy the "**Novelty Status**" of an invention, rendering it ineligible for a patent and devaluing the startup's potential.

Financial Grants and IPR Subsidies

The Government of Maharashtra, in collaboration with state universities, should establish a dedicated "**State Patent Fund.**" This initiative should provide an **80% subsidy** on attorney fees and statutory government charges for student-led startups. By alleviating the financial burden of legal protection, the state can ensure that a "Brilliant Research Idea" successfully transitions into a "**High-Value Business Asset**" without being stalled by initial capital constraints.

Integration of IPR in the Academic Curriculum

Intellectual Property Rights must be integrated as a **Mandatory Credit-Based Course** for all Engineering, Science, and Management disciplines. By **2026**, the educational objective should be to ensure that every graduate possesses the foundational literacy to distinguish between **Patents, Trademarks, and Copyrights**. This academic reform is essential to make the next generation of researchers truly "**Startup-Ready**" and globally competitive.

Industry-Academia "Tech-Transfer" Initiatives

Higher Education Institutions (HEIs) should facilitate regular "**Innovation Demo Days**" and "**Tech-Transfer Meets.**" These platforms will allow student innovators to showcase their **Patented Research** to industry leaders, angel investors, and venture capitalists. Such structured interactions are critical for the commercialization of academic research, bridging the gap between laboratory

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prototypes and actual market needs, thereby significantly enhancing the **Market Valuation** of academic startups.

Simplified "Single-Window" Filing System

The State Government, in strategic collaboration with the **Office of the Controller General of Patents, Designs & Trademarks (CGPDTM)**, should develop a streamlined, digital "**Single-Window**" filing system specifically designed for academic start-ups. By 2026, the objective should be to eliminate redundant administrative layers and minimize bureaucratic delays. Such a "Fast-Track" mechanism will encourage a higher volume of student innovators to secure their **Intellectual Property Rights (IPR)** and accelerate their time-to-market, thereby enhancing the overall agility of Maharashtra's start up ecosystem.

Conclusion

Summary of Findings

The transition of Maharashtra's higher education system from a traditional "**Degree-Granting**" model to a proactive "**Innovation-Driving**" ecosystem is a defining economic shift in 2026. This study concludes that **Intellectual Property Rights (IPR)** serve as the fundamental structural bridge between academic research and commercial business success. The empirical data collected from 100 start-ups confirms that student-led ventures with registered Patents and Trademarks command a **Market Valuation** that is approximately **5.2 times higher** than those lacking legal protection. Furthermore, such start-ups exhibit a **70% higher success rate** in securing institutional Venture Capital (VC) funding.

Regional Insights: The Nashik Potential

A significant finding of this research is the emergence of Tier-2 cities as the new frontiers of innovation. While the metro hubs of Mumbai and Pune maintain their historical dominance due to infrastructure, districts like **Nashik** demonstrate immense untapped potential, particularly in **Agri-tech, Smart Manufacturing, and Sustainable Engineering**. However, the "Business Status" of Nashik's start-ups is currently limited by a "**Knowledge Gap**" in IPR filing. The study concludes that regional parity can only be achieved if Higher Education Institutions (HEIs) in North Maharashtra aggressively address these gaps by providing localized, low-cost legal support.

The "Patent-First" Paradigm Shift

The research underscores that a "**Patent-First, Publish Later**" culture is now essential for the survival and scalability of academic ventures. In the competitive landscape of 2026, the "**Status**" of a start-ups is no longer defined merely by the novelty of its idea, but by the legal strength of its **Protected Intellectual Assets**. The current trend of prioritizing journal publication over patenting is identified as a major "**Economic Leakage,**" where high-value Indian innovations are often lost to the global public domain without commercial benefit to the original researcher.

Strategic Roadmap for a $1 Trillion Economy

For Maharashtra to achieve its ambitious goal of a **$1 Trillion economy**, the integration of IPR into the academic fabric is no longer optional. This study recommends a three-pronged strategy:

1. **Policy Reform:** Mandatory IPR literacy and "Innovation Credits" in the university curriculum as per **NEP 2020**.
2. **Financial Support:** Robust state-sponsored subsidies to eliminate the prohibitive costs of patent filing for students.
3. **Infrastructure:** Strengthening university-linked incubation centers to act as "**Tech-Transfer**" hubs.

Acknowledgment

I would like to express my sincere gratitude to all those who supported me in completing this study on *The Impact of IPR Awareness on the Market Valuation of Academic Startups in Maharashtra (2026)*.

First and foremost, I extend my heartfelt thanks to my teachers and mentors for their invaluable guidance, continuous encouragement, and insightful suggestions throughout the course of this project. Their support greatly enhanced my understanding of intellectual property rights, startup valuation, and the role of awareness in strengthening innovation ecosystems.

I would also like to acknowledge the contributions of researchers, academicians, policymakers, and industry experts whose work on intellectual property, entrepreneurship, and market dynamics provided a strong foundation for this study.

My sincere appreciation goes to my friends and peers for their encouragement, cooperation, and constructive feedback during the preparation of this work.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Ethical AI and Governance: A Commerce-Centric Synthesis of Principles, Standards, and Corporate Stewardship

Preeti Suraj Naik[1]Dr. Sharmila Kavedia[2]
[1]MES Garware College of Commerce, Department of Research and Innovation, Karve Road, Pune
[2]Guide

Manuscript ID: BN-2026-030339

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 174-177

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI: 10.5281/zenodo.20841303
DOI link: https://doi.org/10.5281/zenodo.20841303

Abstract

*Artificial Intelligence (AI) is now a pervasive general-purpose technology, reshaping customer experience, operations, supply chains, and finance. These gains are shadowed by ethical risks: opaque decision-making, bias and discrimination, privacy violations, safety/security failures, and systemic concentration risks within the AI supply chain. Modern governance is responding with principles (OECD, UNESCO), regulations (EU AI Act), management-system standards (ISO/IEC 42001), and risk frameworks (NIST AI RMF). This paper integrates those guardrails through a commerce lens: board accountability, assurance and auditability, documentation practices (e.g., model cards and datasheets), and market-level implications (e.g., transparency in supply chains, Indian DPDP Act compliance). I propose a practical operating model—**G-A-M-E** (Govern–Assure–Measure–Engage)—to institutionalize ethical AI in corporations, and outline research directions for empirical testing in finance, retail, and manufacturing.*

Keywords: *Ethical AI, corporate governance, AI assurance, ISO/IEC 42001, EU AI Act, NIST AI RMF, OECD AI Principles, DPDP Act (India), supply chains, board oversight, audit*

Introduction: From Principles to Profits—Why Commerce Needs Ethical AI

AI's diffusion across value chains has created measurable efficiency and revenue opportunities, yet also new conduct and compliance risks that carry real financial exposure (fines, class actions, enforcement, reputational loss). The EU AI Act established the world's first comprehensive, risk-tiered regime for AI, with early provisions already applicable and staggered obligations for providers and deployers, including transparency and high-risk system requirements. [eur-lex.europa.eu], [akeuropa.eu], [aiactinfo.eu]

Global principles preceded regulation. The OECD AI Principles (2019; updated 2024) remain the leading intergovernmental baseline for *trustworthy AI*—inclusive growth, human rights and democratic values, transparency/explainability, robustness/safety, and accountability—guiding national policies and interoperability. UNESCO's 2021 Recommendation adds policy action areas (e.g., data governance, environment, gender) and operationalizes a human-rights approach for member states. [oecd.org], [oecd.ai] [unesco.org], [naavi.org]

Organizations need *operational* scaffolding. NIST's AI Risk Management Framework (AI RMF 1.0) articulates the **GOVERN–MAP–MEASURE–MANAGE** functions for socio-technical AI risk, now extended with a generative-AI profile. ISO/IEC 42001 (AIMS) adds a certifiable management system for AI, aligning with the Plan–Do–Check–Act cycle and complementing regulatory obligations such as the EU AI Act. [nist.gov], [data.aclum.org] [iso.org], [isaca.org]

This paper synthesizes these threads for corporate leaders and scholars in commerce, focusing on governance structures, assurance modalities, and measurable outcomes.

- **Literature and Policy Landscape**
- **Global Principles and Public Policy**

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Address for correspondence:
Preeti Suraj Naik, MES Garware College of Commerce, Department of Research and Innovation,Karve Road, Pune
Email: preeti11284@gmail.com

How to cite this article:
Naik, P. S., & Kavedia, S. (2026). Ethical AI and Governance: A Commerce-Centric Synthesis of Principles, Standards, and Corporate Stewardship. Bulletin of Nexus Journal, 3(3(II)), 174–177. https://doi.org/10.5281/zenodo.20841303

Quick Response Code:

Website: https://bnir.us

- **OECD AI Principles (2019; updated 2024):** foundational, flexible, and widely referenced by the EU, Council of Europe, UN, and US. [oecd.ai]
- **UNESCO Recommendation (2021):** translates principles into sectoral policy action (data governance, environment, education, gender, health), emphasizing human oversight and rights. [unesco.org]
- **EU AI Act (2024 Regulation 2024/1689):** bans unacceptable practices, imposes obligations on high-risk systems (risk management, data governance, technical documentation, logging, human oversight), mandates transparency for certain uses, and introduces governance, post-market monitoring, penalties, and GPAI model rules. [eur-lex.europa.eu], [aiactinfo.eu]

Risk and Management Frameworks

- **NIST AI RMF 1.0 & GAI Profile:** voluntary, sector-agnostic, embedding trustworthiness attributes (valid/reliable, safe, secure/resilient, accountable/transparent, explainable, privacy-enhanced, fair). [nist.gov]
- **ISO/IEC 42001:** first certifiable AI management system standard (AIMS), specifying leadership, policy, risk assessment/treatment, impact assessment, performance evaluation, and continuous improvement; commonly paired with the EU AI Act. [iso.org], [isaca.org]

Assurance, Audit, and Internal Controls

- **ISACA AI Audit Toolkit & IIA AI Auditing Framework:** control libraries and assurance guidance to evaluate governance, bias, explainability, drift monitoring, and security. [isaca.org], [theiia.org]
- **Documentation practices:** *Model Cards* and *Datasheets for Datasets* institutionalize transparency about model intent, performance across subgroups, data provenance, limitations, and risks—key to auditability and regulatory evidence. [arxiv.org], [microsoft.com]

Corporate Governance and Board Oversight

Boards are under mounting pressure to oversee AI strategy and risk, with surveys showing a knowledge and agenda gap and regulators (e.g., SEC) signalling scrutiny of AI-related disclosures. Deloitte boardroom surveys confirm increasing—but still uneven—board engagement and the need to rethink composition and time allocation. [corpgov.la...arvard.edu], [corpgov.la...arvard.edu] [corpgov.la...arvard.edu]

Ethical Risk Typology in Commerce

1. **Bias and discrimination:** High-stakes decisions (lending, hiring, pricing) risk disparate impact absent robust data governance and model evaluation; OECD/UNESCO emphasize fairness, human rights, and redress mechanisms. [oecd.ai], [unesco.org]
2. **Opacity and explain ability:** Business users, auditors, and affected stakeholders need rationale traceability for consequential decisions—codified in NIST RMF attributes and EU AI Act transparency/human oversight requirements. [nist.gov], [aiactinfo.eu]
3. **Privacy and data protection:** India's **DPDP Act (2023)** imposes consent, purpose limitation, erasure, SDF obligations (e.g., DPIAs, audits) and cross-border constraints—reshaping AI training and pipeline design for firms handling Indian data. [ey.com], [grantthornton.in]
4. **Security and supply-chain risk:** The AI supply chain spans hardware, cloud, data, foundation models, and applications; concentration and opacity can create resilience and financial-stability concerns. [bis.org]
5. **Market structure and competition:** Big-tech dominance across AI layers may impact innovation and consumer choice; governance must consider systemic risks not just model-level hazards. [bis.org]

From Principles to Practice: An Operating Model for Firms

I propose **G-A-M-E**—a board-aligned operating model integrating regulations, standards, and assurance:

G — Govern

- **Adopt** ISO/IEC 42001 (AIMS) for policy, roles, competence, and AI impact assessment; align with EU AI Act obligations and NIST RMF GOVERN outcomes. [iso.org], [isaca.org], [nist.gov]
- **Board oversight:** Put AI on every board agenda; clarify committee charters (audit for assurance & controls; risk for enterprise risk; technology/innovation for strategy); evaluate board composition for AI literacy. [corpgov.la...arvard.edu], [corpgov.la...arvard.edu]
- **Ethics & rights guardrails:** Map OECD/UNESCO principles into enterprise policies (human rights due diligence; grievance/redress; environmental and gender impacts). [oecd.ai], [unesco.org]

A — Assure

- **Controls & audit:** Implement ISACA/IIA toolkits to verify data quality, bias testing, explainability, drift monitoring, adversarial robustness, and logging; tie controls to risk tiers under the EU AI Act. [isaca.org], [theiia.org]
- **Documentation:** Require *Model Cards* and *Datasheets* for all material AI systems; treat

them as evidentiary artifacts for regulators and auditors. [arxiv.org], [microsoft.com]

- **Third-party & supply chain:** Extend assurance to model vendors and data brokers; consider ISO/IEC 42001 certification and contractual DPDP/GDPR clauses. [iso.org], [ey.com]

M — Measure

- **Risk & performance metrics:** Use NIST RMF MEASURE outcomes to track trustworthiness attributes (safety, robustness, fairness, privacy) with KPIs and tolerance thresholds. [nist.gov]
- **Post-market monitoring:** Implement EU AI Act post-deployment surveillance and incident reporting; maintain logs and conduct periodic re-validation. [eur-lex.europa.eu]

E — Engage

- **Stakeholders:** Communicate AI use, impacts, and redress pathways to customers, employees, and investors; enhance disclosures in MD&A and risk factors. [corpgov.la...arvard.edu]
- **Regulatory dialogue:** Track Commission guidance and codes of practice (for GPAI), and align internal standards with evolving interpretations. [akeuropa.eu]

Sectoral Application: Supply Chain and Manufacturing

AI is recasting supply chains with predictive insights, automation, and resilience benefits; concurrent governance gaps include "shadow AI," documentation opacity, and compliance burdens. Surveys indicate AI is rapidly becoming "mandatory" for competitiveness, yet governance and trade-compliance complexity are increasing—underscoring the need for robust data/AI management and auditability. [frontiersin.org], [unite.ai] [plasticstoday.com], [kpmg.com]

At systemic scale, the AI supply chain's concentration and interdependencies raise resilience and financial-stability concerns that boards should consider within enterprise risk management. [bis.org]

India Focus: DPDP Act and Corporate AI Programs

For firms operating in or processing data from India, the **DPDP Act (2023)** requires consent-centric processing, data minimization, erasure, and special measures for Significant Data Fiduciaries (e.g., DPIAs, audits, DPO)—directly affecting AI training and retraining pipelines, log retention, and cross-border data flows. Emerging analyses emphasize the need for selective deletion capabilities (post-withdrawal), traceability, and explainability embedded into data pipelines—capabilities that dovetail with ISO/IEC 42001 and NIST RMF implementations. [ey.com] [medianama.com], [iso.org]

Research Design for Commerce Scholars

To empirically examine ethical AI governance in business performance, I propose a mixed-methods design:

1. **Policy–Practice Fit (PPF) Index:** Construct a composite index (0–100) scoring firms on adoption depth of OECD/UNESCO principles, NIST RMF coverage, ISO/IEC 42001 maturity, EU AI Act readiness, and DPDP controls; validate with confirmatory factor analysis. [oecd.ai], [unesco.org], [nist.gov], [iso.org], [eur-lex.europa.eu]
2. **Quasi-experimental outcomes:** Difference-in-differences on firms adopting AIMS (ISO/IEC 42001) vs. matched controls to test effects on incident frequency, regulatory findings, and cost of capital. [iso.org]
3. **Assurance artifacts auditability study:** Measure the association between the use of *Model Cards*/*Datasheets* and audit effort (hours) and exceptions in internal/external audits using ISACA/IIA frameworks. [arxiv.org], [microsoft.com], [isaca.org], [theiia.org]
4. **Board governance panel:** Relate board AI literacy/agenda frequency (as per corporate governance surveys) to disclosure quality and incident remediation speed. [corpgov.la...arvard.edu], [corpgov.la...arvard.edu]

Managerial Playbook (12-Point Checklist)

1. Map AI systems to use-cases and risk tiers (EU AI Act; DPDP scope). [eur-lex.europa.eu], [ey.com]
2. Stand up an **AI Management System** (ISO/IEC 42001) with policy, roles, competence, and impact assessment. [iso.org]
3. Align with **NIST AI RMF**; define target profiles, metrics, and monitoring cadences. [nist.gov]
4. Establish board oversight and committee charters; schedule AI at each meeting. [corpgov.la...arvard.edu]
5. Require **Model Cards** and **Datasheets** for material models/datasets. [arxiv.org], [microsoft.com]
6. Implement **ISACA/IIA** control libraries; plan periodic independent audits. [isaca.org], [theiia.org]
7. Harden the AI supply chain: vendor AIMS certification, security attestations, and data lineage. [iso.org], [bis.org]
8. Operationalize DPDP consent, erasure, and SDF obligations for Indian data. [ey.com]
9. Run Fundamental Rights Impact Assessments (where applicable) and maintain logging for post-market monitoring. [eur-lex.europa.eu]

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10. Create escalation and incident response playbooks for AI malfunctions or harms. [nist.gov]
11. Disclose AI risk factors and governance approach in investor communications. [corpgov.la...arvard.edu]
12. Invest in AI literacy and role-based training across the enterprise. [nist.gov]

Discussion: Balancing Innovation and Assurance

Ethical AI governance is often viewed as a constraint; the commerce literature should instead treat it as an *enabler of durable value creation*. Empirical supply-chain and manufacturing studies indicate that digital/AI transformation boosts transparency and resilience, but governance maturity determines whether benefits are captured without hidden risks (shadow AI, undocumented components, non-compliance). The EU AI Act and ISO/IEC 42001 pairing provides a credible *what/how* roadmap; NIST RMF brings measurement discipline; and documentation norms (model/dataset cards) unlock assurance and learning. [frontiersin.org], [unite.ai] [eur-lex.europa.eu], [isaca.org], [nist.gov], [arxiv.org]

Conclusion and Future Work

Commerce needs AI that is *profitable, provable, and principled*. Boards and executives can institutionalize this by adopting a layered approach: principles (OECD/UNESCO), regulation (EU AI Act; DPDP), management systems (ISO/IEC 42001), and risk/assurance frameworks (NIST RMF; ISACA/IIA). The proposed **G-A-M-E** model and research design invite rigorous testing across sectors with measurable KPIs (incidents, audit exceptions, cost of capital, customer trust). As the AI supply chain consolidates and GPAI evolves, ethical governance will be a source of competitive advantage and systemic resilience. [bis.org]

Acknowledgements

This synthesis draws on public regulatory texts, intergovernmental recommendations, and standards frameworks to offer a commerce-oriented governance model for ethical AI.

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  - Model Cards; Datasheets for Datasets. [arxiv.org], [microsoft.com]
- **Corporate Governance**
  - Board oversight and AI governance—Harvard Law Forum and Deloitte posts. [corpgov.la...arvard.edu], [corpgov.la...arvard.edu]
- **Supply Chains and Systemic Risk**
  - Digital transformation & supply chains (Frontiers); AI readiness gaps; AI supply chain (BIS). [frontiersin.org], [unite.ai], [bis.org]

Appendix A: A Minimal "Model Card" & "Dataset Datasheet" Template (for Corporate Use)

Model Card (1–3 pages)

- *Intended Use/Out-of-Scope*; *Users*; *Training Data Summary*; *Performance by Segment*; *Explainability Methods*; *Known Limitations*; *Safety/Robustness tests*; *Update & Monitoring cadence*. [arxiv.org]

Datasheet for Datasets (2–5 pages)

- *Motivation*; *Composition*; *Collection & Consent*; *Labeling*; *Preprocessing*; *Recommended Uses & Prohibitions*; *Ethical/Legal considerations*; *Maintenance/Versioning*. [microsoft.com]

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Design and Development of a Real-Time Power BI Dashboard for Tractor Sales, Competitor Analysis, and Market Trend Prediction

Pooja R. Patil[1] Shreya A. Patil[2]
[1]Assistant Professor, Yashoda Technical Campus, Satara
[2]Student of MBA II, Yashoda Technical Campus, Satara

Manuscript ID:
BN-2026-030340

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 178-185

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20841484
DOI link:
https://doi.org/10.5281/zenodo.20841484

Abstract

The study aims to design and develop a real-time dashboard using Microsoft Power BI to analyze tractor sales, competitor performance, and future market trends. The objective is to transform raw data into meaningful insights that support effective business decision-making. The research focuses on tractor manufacturing companies in Satara city and evaluates sales and competitive performance using predictive analytics. For the study, four leading tractor brands like John Deere, Sonalika, Escorts Kubota, and Mahindra along with the domestic brand Cooper were considered. The research is based on both primary and secondary data. Primary data was collected through questionnaires from 51 tractor owners, while secondary data was obtained from company reports, official websites, and the platform Tractor Junction. Microsoft Excel was used for data preparation, and Power BI was used to develop interactive dashboards for visualizing sales trends, regional performance, dealer contributions, and customer responses. The findings indicate variations between expected and actual sales across regions and channels. The study demonstrates that real-time dashboards combined with predictive analytics can improve sales monitoring, strategic planning, and data-driven decision-making.

Keywords: *Power BI Dashboard, Competitors analysis, Predictive Analysis, Data visualization, Decision-making,*

Introduction:

In today's competitive business world, organizations need quick and accurate insights to make better decisions. Sales performance and competitor activities play a key role in business success. This project focuses on developing a real-time Power BI dashboard that helps to analyze sales data, track competitors, and predict future trends. By combining data visualization with predictive analytics, the system turns raw data into meaningful information that supports smart decision-making. The dashboard provides an easy and interactive way to monitor key performance indicators, understand customer behavior, and identify new business opportunities. This project shows how business intelligence tools like Power BI can make data analysis faster, clearer, and more effective for planning and growth.

For this research the researcher has consider "The Tractor" as the example, for conducting the research and preparing the Real time dashboard for making sales prediction and competitor analysis. The Existing giants and new rivals of tractor market are considered in the research.

Objectives:

1. To design and develop a real-time interactive Power BI dashboard
2. To analyse sales trends
3. To build predictive models using PowerBI dashboard
4. To demonstrate the role of Business Intelligence in supporting data-driven strategic decisions in marketing and sales management.

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Address for correspondence:
Pooja R. Patil,Assistant Professor, Yashoda Technical Campus, Satara
Email: prp_mba@yes.edu.in

How to cite this article:

Patil, P. R., & Patil, S. A. (2026). Design and Development of a Real-Time Power BI Dashboard for Tractor Sales, Competitor Analysis, and Market Trend Prediction. Bulletin of Nexus Journal, 3(3(II)), 178–185. https://doi.org/10.5281/zenodo.20841484

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Literature Review:

The study examined how Microsoft Power BI supports organizational decision-making by converting large volumes of business data into interactive dashboards and visual reports. Using case studies, performance analysis, and user feedback, the research found that Power BI helps managers monitor key performance indicators, identify trends, and make faster strategic decisions. Overall, the study concluded that Power BI improves operational efficiency and enables effective data-driven decision-making in organizations (Pandipati, November-December 2025)

Retail organizations generate large amounts of transactional data that help analyze customer behavior and seasonal demand. Traditional forecasting methods often fail to capture complex market trends, while modern tools like Microsoft Power BI provide interactive dashboards and visual insights for better decision-making. Advanced forecasting models such as Prophet, developed by Meta Platforms, help predict future sales by handling trends and seasonality. This study uses Power BI and Prophet to analyze historical sales data and forecast future sales performance. (Mushan1, November 2025)

Sales analysis plays a key role in the retail industry by supporting supply chain management, inventory control, marketing, and financial planning. Modern data analytics techniques help organizations analyze trends and predict future demand. Tools such as Microsoft Power BI enable retailers to convert large volumes of sales data into interactive dashboards and visual reports, helping businesses monitor sales patterns and make better data-driven decisions to improve profitability and operational efficiency. (Pardeshi, April-2024)

Sales performance analysis helps organizations understand business performance and support effective decision-making. With the growth of digital data, companies use analytics to track sales trends, profits, and regional performance. Tools such as Microsoft Power BI transform raw data into interactive dashboards that monitor key performance indicators and identify growth opportunities. Overall, Power BI supports visual analytics and enables accurate, data-driven business decisions. (Naukarkar, November 2025)

Explained that sales data visualization helps organizations convert complex sales data into clear graphical insights. Using charts, graphs, and dashboards enables managers to identify trends, monitor performance, and support strategic business decisions. The study concluded that data visualization improves decision-making and strengthens business strategy. (Upadhye, 2023)

Discussed the use of data visualization techniques for developing business strategy recommendations using a Microsoft Power BI dashboard. The study highlighted that interactive dashboards help organizations transform large volumes of business data into meaningful visual insights. By using Power BI visualization tools, managers can analyze sales performance, identify trends, and make informed strategic decisions. The research concluded that Power BI dashboards improve data-driven decision-making and support effective business strategy formulation. (Dr. Kallal Banerjee, 2024)

The study highlights the importance of Business Intelligence (BI) tools in supporting effective organizational decision-making. It explains that BI systems transform raw and unstructured data into meaningful insights through dashboards, reports, and visual analytics. By enabling real-time monitoring of key performance indicators, these tools help managers identify trends, evaluate performance, and make timely strategic decisions. The study concludes that BI tools significantly improve decision quality and operational efficiency in modern organizations.(Maaitah, 2023)

This paper has presented a comprehensive conceptual model for an integrated dashboard system aimed at real-time monitoring of sales and logistics KPIs. The growing complexity of supply chains and sales operations, combined with increasing data availability, necessitates sophisticated yet user-friendly tools that can transform raw data into actionable insights. The proposed model integrates technological, organizational, and user-centered dimensions to deliver a scalable, customizable, and secure platform. The literature review underscored the importance of selecting context-appropriate KPIs, ensuring data quality and integration, and designing intuitive visualizations tailored to diverse user needs. (Opeyemi Morenike Filani, 2020)

This paper discusses the manner in which systematic deployment of descriptive, predictive and prescriptive analytics can assist organizations to accumulate, process and analyze high volumes of consumer-related data to understand more about their preferences, purchasing trends, attitudes and decision-making mechanisms. The paper indicates that marketing based on analytics will enable companies to know what customers need, predict demand and better respond to the evolving market trends which will enhance customer satisfaction and loyalty to the brand. (Juneja, 2018)

Research has been performed regarding the elements of good visualization design and its

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current success within the realm off big data, little research has been performed in understanding the use of data visualization to optimize the executive strategic decision-making process from the per spective of executives. In order to establish further insight into the requirements of executives for effective and efficient data visualizations, as well as the practical implications of the literature re viewed, semi-structured interviews were conducted with 13 executives and 4 data analysts in relation to the 3 research questions. (Moore, 2017)

This research paper explores how Power BI can be leveraged for advanced business intelligence and reporting, emphasizing its role in enhancing decision-making processes across various industries. The paper begins by providing an overview of Power BI's core features, including its data connectivity options, visualization capabilities, and integration with other Microsoft tools, such as Azure and Office 365. The flexibility of Power BI allows it to connect with a wide range of data sources, from traditional databases to cloud-based solutions, ensuring that businesses can access their data regardless of its storage location. Through its intuitive interface, users can create compelling visual reports and dashboards, transforming complex data sets into easily digestible insights.(Kumaresan Durvas Jayaraman, 2024)

In this study, a business intelligence tool was implemented to analyze the prices and quantities of agricultural commodities traded in the United States using Power BI. The objective was to design an algorithm that, through the My Market News Application Programming Interface (API), downloads three types of reports terminal market, shipping point, and movement bringing in information from 2015 onward. An extract, transform and load (ETL) process was established to automatically cleanse and unify the data, enabling seamless updates. Finally, a relational model was built that facilitated the creation of user-friendly interactive dashboards (control panels) In addition, Power Query and DAX were employed to enhance data cleaning and ensure accurate visualization. (Torrez, 2025)

Methodology:

For this research, the researcher conducted an extensive review of various articles, websites, social media platforms, and official sources to collect relevant secondary data. These sources provided valuable insights into market trends, user preferences, and developments in the tractor industry. Along with secondary research, a well-structured questionnaire was designed to gather primary data directly from 51 tractor owners. The questionnaire included both open- and close-ended questions to capture detailed opinions and experiences. It was distributed through online platforms and personal interactions in rural and semi-urban areas. Respondents were chosen from different backgrounds to ensure diverse perspectives. The collected data was then analyzed carefully to draw meaningful and reliable conclusions for the study.

Design of Real-time Dashboard Using Power BI:

Power BI is a powerful Business Intelligence tool used to create real-time, interactive dashboards that help in simplifying and understanding complex data. It allows users to visualize information through various graphical formats such as bar charts, column charts, line charts, scatter plots, pie charts, slicers, and more. These visuals make data analysis more engaging and easier to interpret for decision-makers. The dashboards in Power BI are dynamic and interactive because they are built on relational data models that connect different datasets seamlessly. As the source data is updated, the dashboards automatically refresh to display the most recent information by adding the refresh visual i.e. Play axis. This real-time capability enables companies to monitor their performance continuously and compare it with competitors. It also supports timely and informed decision-making for planning business strategies and identifying growth opportunities. Overall, Power BI enhances data-driven decision-making through its advanced visualization and automation features.

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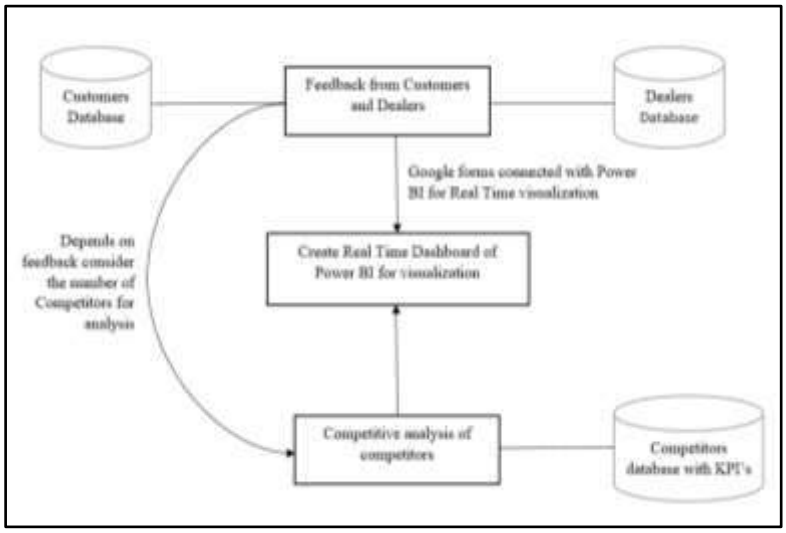
Design of Model:



The above design illustrates the overall framework of the research model, describing how data is collected, processed, and visualized in real time using PowerBI. The model integrates customer, dealer, and competitor data to create interactive dashboards that support data-driven decision-making.

The process begins with collecting data from two main sources: the Customer Database and the Dealer Database. Feedback from both customers is gathered through Google Forms, which are directly connected to PowerBI for real-time visualization. This feedback forms the basis for developing dashboards: The Customer Feedback Dashboard, which highlights satisfaction levels and service quality. The Sales Metrics Dashboard, which analyses sales performance and dealer activities is gathered from the company's sources. Based on the insights from feedback, the number of competitors to be analysed is determined. Data about these competitors, including their Key Performance Indicators (KPIs) such as sales, market share, and performance benchmarks, is collected and stored in the Competitors Database. This data supports the creation of the Competitor Comparison Analysis Dashboard, which visually compares the organization's performance against its competitors.

Collectively, these three dashboards Sales Metrics, Customer Feedback, and Competitor Comparison provide a comprehensive and real-time understanding of business performance. The model helps identify strengths, weaknesses, and market opportunities, ultimately assisting management in making strategic and evidence-based decisions to improve efficiency and competitiveness.

Dashboard No.1: Sales Metrics Dashboard



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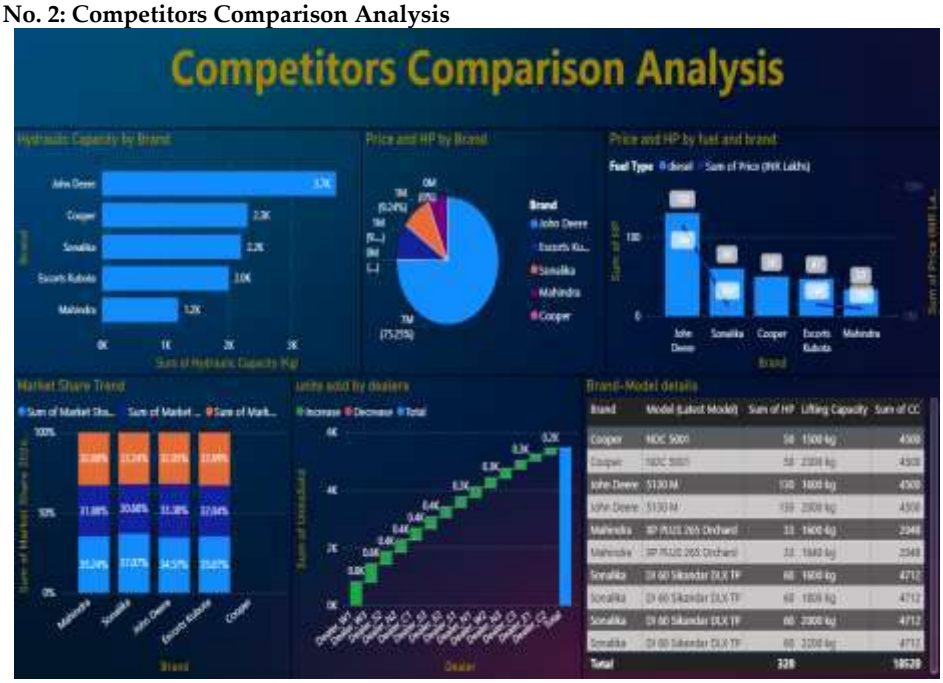
Purpose of the Sales Metrics Dashboard

The purpose of the Sales Metrics Dashboard is to provide a comprehensive and visual overview of tractor sales performance to support data-driven decision-making. The dashboard helps management monitor key sales indicators such as total units sold, revenue generated, average unit price, and sales trends over time. It enables stakeholders to quickly understand overall business performance and identify patterns in sales across different periods.

What the Dashboard Analyzes

The dashboard analyzes multiple aspects of sales performance, including **monthly sales trends, model-wise sales distribution, regional performance, dealer and distributor contributions, and estimated versus actual sales comparisons**. It helps identify high-performing regions, top-selling models, and leading dealers while also highlighting underperforming areas that may require strategic improvement. By presenting these insights through visual analytics, the dashboard assists businesses in evaluating market demand, optimizing sales strategies, and improving operational planning.

Dashboard No. 2: Competitors Comparison Analysis



Purpose of the Competitors Comparison Analysis Dashboard

The purpose of the Competitors Comparison Analysis Dashboard is to evaluate the competitive position of Cooper in the tractor market by comparing its products with major competitors such as John Deere, Sonalika, Escorts Kubota, and Mahindra. The dashboard helps management understand how Cooper performs relative to competing brands in terms of product specifications, pricing, and market presence.

What the Dashboard Analyzes

The dashboard analyzes key competitive factors including hydraulic lifting capacity, horsepower, price range, market share, model specifications, and dealer sales performance. It enables comparison of Cooper's tractor models with those of competing brands to identify strengths, weaknesses, and potential improvement areas. By visualizing these insights, the dashboard supports strategic decision-making related to product development, pricing strategy, market positioning, and competitive growth in the agricultural machinery market.

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Dashboard No. 3: Customer Feedback Dashboard



Purpose of the Customer Feedback Dashboard

The purpose of the Customer Feedback Dashboard is to evaluate customer satisfaction, identify common product issues, and understand overall brand perception of Cooper tractors in comparison with competitors such as John Deere and Sonalika. The dashboard helps management monitor customer opinions, complaints, and service-related feedback to improve product quality and customer experience.

What the Dashboard Analyzes

The dashboard analyzes customer sentiment, major technical issues, and satisfaction levels by brand, regional feedback patterns, and service-related complaints. It highlights common problems such as electrical faults, overheating, hydraulic lifting issues, and service delays. Additionally, it evaluates customer satisfaction across regions and summarizes user feedback comments to identify strengths and weaknesses in product performance and after-sales support. These insights help the company improve product reliability, service efficiency, and overall customer satisfaction, ultimately supporting stronger brand loyalty and future sales growth.

Key Findings:

1. The study shows that younger farmers and medium-scale farm owners are the main users of tractors, reflecting increasing adoption of mechanized farming practices. Tractors are primarily used for essential agricultural activities such as ploughing, sowing, and harvesting, helping farmers improve productivity and reduce manual labor.
2. Major brands like Mahindra & Mahindra and John Deere dominate the market due to their strong reputation and reliable service networks, while Cooper Corporation shows growing potential. Although farmers value performance, comfort, and modern features, some technical issues such as electrical faults and overheating still occur. Overall, tractor adoption is increasing, but improvements in product reliability and service support are needed.
3. The Sales Metrics Dashboard shows that the company performed well, selling 5461 units and earning about 200 crore in revenue. Most sales came through dealers, with Maharashtra leading in performance. However, there is still room to improve sales in weaker regions and months by strengthening marketing and dealer support.
4. The Competitors Comparison Dashboard shows that John Deere leads in power and performance, while brands like Cooper, Sonalika, and Mahindra offer competitive but more affordable options. The overall market is highly competitive, with each brand holding a similar share, indicating that customer choice depends on product features and pricing balance.
5. The Customer Feedback Dashboard shows that most users are young, small to medium-scale farmers who mainly use Cooper tractors. They like features such as cooling systems and power but want better fuel efficiency and faster service responses. Overall, customers are fairly satisfied, but improving after-sales service and technology could boost their trust and loyalty.

Suggestions

1. Focus on younger farmers by promoting tractors with modern technology, easy handling, and digital features through social media and local field demonstrations. This group is open to innovation and can drive

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faster adoption of advanced machines in agriculture.

2. Develop tractors for medium-scale farmers managing 2–5 acres of land, offering affordable models that balance power, efficiency, and maintenance costs. This approach will directly target the largest and most active segment of tractor users.
3. Improve reliability and comfort features by addressing issues like overheating, electrical faults, and transmission problems. Adding comfortable cabins and smooth controls will enhance user experience during long working hours.
4. Strengthen after-sales service and dealer networks to provide faster repairs, better spare parts availability, and more responsive customer support. This will build stronger trust and long-term brand loyalty among farmers.
5. Increase sales in weaker regions such as low-performing states by offering dealer incentives, marketing campaigns, and promotional discounts. These efforts will help balance sales throughout all regions and seasons.
6. Highlight key farming functions like ploughing efficiency by promoting tractors with higher hydraulic power and durable engines. This will appeal to farmers who prioritize strong soil preparation and productivity.
7. Upgrade technology and fuel efficiency to match leading competitors and meet farmer expectations. Incorporating smart features, better mileage, and sustainability will make tractors more attractive to modern users.

Conclusion:

The overall analysis reveals that while Cooper has a solid foothold in mid-range tractor markets, its performance is highly dependent on dealers and strong regions like the West. Sales trends show potential for growth, but inconsistent dealer performance and weak presence in certain regions limit expansion. Competitor comparisons indicate that Cooper offers fair value in terms of price and performance, but lacks advanced features and innovation to challenge premium brands like John Deere. To solidify its position, Cooper must upgrade technical specifications, especially in lifting capacity, and emphasize its existing strengths such as fuel efficiency and cooling systems.

Customer feedback highlights urgent areas of improvement electrical faults, overheating, and slow after-sales service. These recurring issues directly affect customer loyalty and brand perception. If Cooper focuses on resolving technical complaints and building a stronger service network, particularly in underperforming regions, it can significantly enhance satisfaction levels and market retention. With strategic improvements and improved customer engagement, Cooper can progress from a mid-level competitor to a more trusted and competitive brand in the agricultural machinery market.

Acknowledgment

I would like to express my sincere gratitude to all those who contributed to the successful completion of my project titled *"Design and Development of a Real-Time Power BI Dashboard for Tractor Sales, Competitor Analysis, and Market Trend Prediction."*

First and foremost, I extend my heartfelt thanks to my academic guide for their invaluable guidance, continuous support, and constructive feedback throughout the development of this project. Their insights were instrumental in shaping both the analytical framework and technical implementation of the dashboard.

I am deeply thankful to all individuals and industry professionals who provided relevant data, insights, and practical perspectives on tractor sales, competitor strategies, and market dynamics. Their contributions greatly enhanced the quality and real-world relevance of this study.

I would also like to acknowledge my institution and faculty members for providing the necessary resources, tools, and a conducive learning environment that enabled me to successfully design and develop this project using Microsoft Power BI.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

India's Holistic Development Path: Vikasit Bharat 2047

Jadhav Parikshit Shatrughan
K. J. Smaiya Arts, Commerce & Science College Kopargaon

Manuscript ID:
BN-2026-030341

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 186-188

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20841564
DOI link:
https://doi.org/10.5281/zenodo.20841564

Abstract:

Vikasit Bharat 2047 is a comprehensive long-term vision aimed at transforming India into a developed, prosperous, inclusive, and sustainable nation by the year 2047. This research paper examines various dimensions of this vision, including economic growth, social equity, technological advancement, environmental sustainability, and good governance. It also analyzes the policies, challenges, and opportunities necessary to achieve these objectives.

Keywords: *Vikasit Bharat 2047, Economic Growth, Social Development, Digital Transformation, Infrastructure, Good Governance, Sustainability*

Introduction:

Vikasit Bharat 2047 is an ambitious and visionary initiative designed for India's holistic development. Its primary objective is to transform India into a developed, prosperous, and globally influential nation by 2047, marking 100 years of independence. Although India has made remarkable progress in many sectors since independence, challenges such as poverty, unemployment, social inequality, and inadequate infrastructure still persist.In this context, the Prime Minister of India introduced the concept of "Vikasit Bharat 2047" to provide a new direction for national development. This vision goes beyond economic growth and emphasizes social justice, technological innovation, environmental sustainability, and good governance. It places citizens at the center and promotes inclusive growth.

India's large youth population, expanding digital capacity, and growing global influence form the foundation of this vision. Therefore, Vikasit Bharat 2047 is not merely a government initiative but a collective national mission requiring the combined efforts of the government, industry, and citizens.

Key Objectives:

1. To transform India into a high-income country
2. To ensure a high quality of life for all citizens
3. To achieve sustainable and inclusive development

Economic Growth:

Economic growth is the backbone of Vikasit Bharat 2047. A strong, dynamic, and inclusive economy is essential for becoming a developed nation. While India has achieved significant economic progress in recent decades, faster and more balanced growth is needed to reach developed status by 2047.

GDP growth and industrialization are key drivers. Initiatives like Make in India aim to boost domestic manufacturing, increase exports, attract foreign direct investment (FDI), and generate employment. Expanding the industrial sector can position India as a global manufacturing hub.

Employment generation is equally important. India's young population is a major asset, but skill development is essential to harness it effectively. Programs like Skill India and Startup India promote entrepreneurship and skill-building. The growth of MSMEs (Micro, Small, and Medium Enterprises) is also crucial for job creation. Financial inclusion ensures access to banking, digital payments, and credit for all sections of society, reducing rural-urban disparities. Infrastructure development-roads, railways, ports, airports, and digital networks-facilitates trade and attracts investment. Enhancing exports and integrating into the global economy are vital for sustained growth.

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Address for correspondence:
Jadhav Parikshit Shatrughan,K. J. Smaiya Arts, Commerce & Science College Kopargaon
Email: Parikshit2592@gmail.com

How to cite this article:

Jadhav, P. S. (2026). India's Holistic Development Path: Vikasit Bharat 2047. Bulletin of Nexus Journal, 3(3(II)), 186–188. https://doi.org/10.5281/zenodo.20841564

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Overall, inclusive and sustainable economic expansion will drive India toward developed nation status.

Social Development:

Social development is essential for the success of Vikasit Bharat 2047. Economic growth alone is insufficient; its benefits must reach every section of society.

Education is the cornerstone of social development. A strong and inclusive education system enhances skills, knowledge, and innovation. Policies promoting digital learning and research are crucial, especially in rural and underprivileged areas.

Healthcare is fundamental. Affordable and quality healthcare services, strengthened primary healthcare systems, modern medical technology, and expanded health insurance coverage are necessary for a healthy population.

Women empowerment is vital. Providing equal opportunities in education, employment, and decision-making enhances overall societal progress. Ensuring women's safety is equally important. Social equality must be achieved by reducing disparities based on caste, religion, gender, and economic status. Poverty alleviation through employment, social security, and basic services will improve living standards.

Technological Advancement:

Technological advancement is a key driver of Vikasit Bharat 2047. A country's development today is measured by its technological capabilities and innovation. Digital transformation is central to this progress. Initiatives like Digital India have expanded internet access, digital services, and e-governance. Online education, digital payments, and e-health services improve efficiency and transparency.

Innovation and startup culture are accelerating growth. Technologies such as Artificial Intelligence (AI), Machine Learning, Block chain, Robotics, and the Internet of Things are transforming industries.

Investment in Research and Development (R&D) is essential. Collaboration between academic institutions, research centers, and industries fosters innovation.

Strengthening digital infrastructure-broadband connectivity, 5G networks, and data centers-will bridge the rural-urban digital divide. Cyber security and data protection are also critical for building trust in the digital ecosystem.

Infrastructure Development:

Infrastructure development is crucial for achieving Vikasit Bharat 2047. Modern, efficient, and sustainable infrastructure boosts economic growth and improves quality of life. India is expanding roads, railways, ports, airports, energy systems, water resources, and digital networks. Projects like national highways, rural roads, and smart cities enhance connectivity and economic activity.

Railway modernization, including high-speed trains and station redevelopment, improves transportation. Port and logistics development through initiatives like Sagarmala and Bharatmala reduces costs and enhances global competitiveness. India is also focusing on renewable energy, such as solar and wind power, promoting sustainability and energy independence. Water management and access to clean drinking water are equally important.

Digital infrastructure strengthens governance and service delivery. However, challenges like funding constraints, delays, environmental concerns, and land acquisition need effective solutions through PPP models and better planning.

Good Governance:

Good governance is the foundation of Vikasit Bharat 2047. It ensures transparency, accountability, efficiency, and citizen participation.

Transparency and accountability are strengthened through RTI, digital platforms, and e-governance. Efficient service delivery through online systems simplifies processes.

Citizen participation through democratic institutions like Gram Sabhas ensures inclusive decision-making. Rule of law and equality guarantee justice and stability.Challenges such as corruption, bureaucratic delays, and implementation gaps must be addressed through reforms and technology-driven governance.

Challenges:

Despite its potential, Vikasit Bharat 2047 faces several challenges:

- Economic inequality between regions and social groups
- Rapid population growth stressing resources
- Gaps in education and skill development
- Weak healthcare systems in rural areas
- Environmental issues like pollution and climate change
- Governance inefficiencies and corruption
- Digital divide between rural and urban areas
- Addressing these challenges requires inclusive policies, innovation, and strong implementation mechanisms.

Policy Recommendations:

To achieve Vikasit Bharat 2047:

1. Promote inclusive economic growth and MSMEs.
2. Strengthen education and skill development.
3. Invest in infrastructure through PPP models.
4. Expand universal healthcare services.
5. Focus on environmental sustainability.

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6. Improve governance through transparency and digitalization.
7. Enhance digital inclusion and connectivity.
8. Strengthen national security and foreign policy.

Conclusion:

Vikasit Bharat 2047 represents a transformative vision for India's future. It aims to create a nation that is economically strong, socially inclusive, and technologically advanced by its 100th year of independence.

Balanced progress across economic, social, technological, and governance sectors is essential. Reducing inequalities, creating jobs, improving education and healthcare, and leveraging digital technologies will be key priorities.

Sustainable development through renewable energy and resource management is equally important. Although challenges exist, they can be overcome through effective policies and collective efforts.

Vikasit Bharat 2047 is a shared national mission. With coordinated efforts from the government, industry, and citizens, India can emerge as a developed, prosperous, and self-reliant nation by 2047.

Acknowledgement

I would like to express my sincere gratitude to all those who contributed, directly or indirectly, to the understanding and preparation of the topic **"India's Holistic Development Path: Viksit Bharat 2047."** The vision of Viksit Bharat 2047 aims to transform India into a developed, inclusive, sustainable, and globally competitive nation by the centenary year of its independence. This vision emphasizes economic growth, social equity, technological advancement, environmental sustainability, and good governance as key pillars of national development.

I extend my heartfelt appreciation to the Government of India, policymakers, researchers, educators, and development practitioners whose insights and initiatives provide valuable guidance toward achieving the goals of Viksit Bharat 2047. Special thanks are due to academic institutions, publications, and public policy platforms that have enriched the discourse on sustainable and holistic development.

I also acknowledge the importance of citizens, youth, farmers, entrepreneurs, civil servants, and community organizations whose collective efforts are essential in realizing the vision of a prosperous and developed India. The journey toward Viksit Bharat requires active participation from every section of society, combining traditional wisdom with innovation, technology, and sustainable practices.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

Effect of Digital Payment Systems on Consumer Behaviour in Maharashtra

Arun Parasram Kadam
Assistant Professor, C.D. Jain College of Commerce, Shrirampur

Manuscript ID:
BN-2026-030342

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 189-192

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20841625
DOI link:
https://doi.org/10.5281/zenodo.20841625

Abstract

Digital payment systems have emerged as a major driver of financial transformation in India. The rapid expansion of internet connectivity, smartphone penetration, and government initiatives promoting a cashless economy have accelerated the adoption of electronic payment methods across both urban and semi-urban regions. Payment mechanisms such as Unified Payments Interface (UPI), debit and credit cards, mobile wallets, internet banking, and QR-code-based transactions are increasingly influencing consumer purchasing behaviour, spending patterns, and financial decision-making.

The present empirical study examines the impact of digital payment systems on consumer behaviour in Maharashtra. The research is based on primary data collected from 50 respondents belonging to urban and semi-urban areas through a structured questionnaire. The collected information was systematically classified, tabulated, and analysed using percentage analysis techniques.

The findings indicate that consumers prefer digital payment systems primarily because of convenience, speed, accessibility, security, and ease of transaction. The growing acceptance of digital payments has encouraged online shopping and increased the frequency of consumer purchases. However, concerns related to cyber fraud, limited technical awareness, and internet connectivity issues continue to influence consumer confidence.

The study concludes that digital payment systems have significantly transformed consumer behaviour in Maharashtra and are playing a crucial role in strengthening the digital economy and promoting cashless financial transactions.

Keywords: *Digital Payment Systems, Consumer Behaviour, UPI, Mobile Wallets, Internet Banking, Cashless Economy, Online Transactions, Financial Technology, Electronic Payments, Digital Economy*

Introduction

The rapid advancement of information and communication technology has transformed the way financial transactions are carried out in India. In recent years, digital payment systems have become increasingly popular due to technological development, improved internet accessibility, and various government initiatives promoting digitalisation. Consumers today can complete transactions through UPI applications, debit and credit cards, internet banking, mobile wallets, and QR-code payment systems without depending heavily on physical cash.

Consumer behaviour refers to the manner in which individuals select, purchase, and utilise goods and services to satisfy their needs and wants. The emergence of digital payment systems has brought noticeable changes in consumer behaviour. Individuals now prefer quicker and more convenient methods of payment that reduce the need to carry cash and simplify financial transactions. Digital payment facilities have also encouraged online shopping, cashless transactions, and instant payments.

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Address for correspondence:
Arun Parasram Kadam,Assistant Professor, C.D. Jain College of Commerce, Shrirampur
Email: arukadam777@gmail.com

How to cite this article:
Kadam, A. P. (2026). Effect of Digital Payment Systems on Consumer Behaviour in Maharashtra. Bulletin of Nexus Journal, 3(3(II)), 189–192. https://doi.org/10.5281/zenodo.20841625

Quick Response Code:

Website: https://bnir.us

Consumers are able to maintain transaction records, monitor their expenditure, and make timely purchases through mobile applications and banking platforms. These developments have increased the importance of digital financial services in everyday life.

In Maharashtra, digital payment usage has expanded not only in metropolitan cities but also in semi-urban and rural areas. Small retailers, grocery stores, fuel stations, restaurants, and service providers now widely accept digital payments through UPI and QR codes. As a result, consumer spending habits and purchasing behaviour have experienced considerable changes.

Considering the growing importance of digital transactions, the present study aims to analyse the effect of digital payment systems on consumer behaviour in Maharashtra.

Problem Statement

The use of digital payment systems is increasing rapidly among consumers in Maharashtra. However, the level of acceptance, frequency of use, and influence on purchasing behaviour vary among different categories of consumers. Therefore, it is important to examine how digital payment systems affect spending habits, buying decisions, and consumer preferences.

Objectives of the Study

1. To examine the usage of digital payment systems among consumers.
2. To analyse the impact of digital payment systems on consumer buying behaviour.
3. To identify the major benefits associated with digital payment methods.
4. To study the difficulties experienced by consumers while using digital payment systems.

Research Methodology

The present research is empirical in nature and is primarily based on primary data. Information was collected through a structured questionnaire designed to understand consumer usage of digital payment methods such as UPI, debit cards, mobile wallets, and internet banking.

A total of 50 respondents from urban and semi-urban regions of Maharashtra were selected through the convenience sampling method. The responses obtained from the participants were classified and organised systematically. Percentage analysis and tabulation techniques were used for interpretation of the collected data. Tables and descriptive explanations were applied to present the findings in a clear and understandable manner.

Data Analysis and Interpretation

1. Usage of Digital Payment Systems Among Consumers

The findings of the study indicate that digital payment methods are widely accepted among consumers in Maharashtra. Most respondents reported regular use of digital payment applications instead of depending solely on cash transactions.

Among the total respondents, approximately 36% stated that they frequently use UPI applications for day-to-day payments. Debit and credit cards are preferred by nearly 24% of respondents, while around 16% use mobile wallet applications. Internet banking facilities are utilised by about 14% of consumers. Only 10% of respondents continue to rely mainly on cash transactions.

The increasing preference for digital payments can be attributed to convenience, faster transactions, ease of accessibility, and widespread smartphone usage. The availability of internet services in urban and semi-urban areas has also supported the growth of digital payment adoption. Consumers now commonly use digital platforms for online shopping, utility bill payments, ticket booking, and daily purchases.

2. Influence of Digital Payments on Buying Behaviour

The study reveals that digital payment systems have a noticeable influence on consumer buying behaviour. Around 32% of respondents strongly agreed that digital payment facilities affect their purchasing decisions. Another 36% agreed that they tend to spend more while using digital modes of payment due to the simplicity and speed of transactions.

Approximately 14% of respondents expressed a neutral opinion, indicating that digital payments sometimes influence their buying patterns. On the other hand, nearly 12% disagreed and 6% strongly disagreed with the statement that digital payments affect their purchasing behaviour.

Consumers who preferred cash transactions mentioned reasons such as lack of technological awareness, habit of cash usage, and fear of cyber fraud. Nevertheless, the overall analysis suggests that digital payment systems encourage consumers

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to make faster purchase decisions and increase the frequency of online transactions.

The easy availability of payment options during online shopping motivates consumers to purchase products and services more conveniently. As a result, spending patterns and purchasing behaviour have undergone significant changes.

3. Benefits of Digital Payment Systems

Respondents identified several advantages associated with digital payment methods. A majority of consumers stated that digital transactions save time and reduce the inconvenience of carrying physical cash. Many respondents also appreciated the availability of transaction records, which help them track and manage their financial expenditure effectively.

Consumers further reported that cashback offers, discounts, reward points, and promotional schemes encourage them to use digital payment systems more frequently. The convenience of making instant payments from any location was also considered an important benefit.

The findings clearly indicate that digital payment systems enhance consumer satisfaction by making financial transactions simple, quick, and efficient. Due to these benefits, digital transactions are continuously increasing across Maharashtra.

4. Problems Faced While Using Digital Payments

Despite the growing acceptance of digital payment systems, certain challenges continue to affect users. Some respondents expressed concern regarding online fraud, cyber security risks, and unauthorised access to financial information.

Network connectivity issues and technical problems were also reported as major obstacles, particularly in semi-urban and rural areas. In addition, elderly consumers and individuals with limited technological knowledge often face difficulty in operating mobile applications and internet banking platforms.

The analysis suggests that awareness programmes, digital literacy campaigns, and proper training can improve consumer confidence and encourage greater adoption of digital payment systems among all age groups.

5. Overall Impact on Consumer Behaviour

The overall findings of the study demonstrate that digital payment systems have significantly influenced consumer behaviour in Maharashtra. Consumers using digital payment methods tend to purchase goods and services more frequently, prefer online transactions, and make quicker purchasing decisions.

The widespread availability of easy and secure payment options has transformed traditional purchasing patterns and contributed to the growth of the digital economy. Digital transactions have become an integral part of modern consumer life and are expected to continue influencing buying behaviour in the future.

Table 1: Use of Digital Payment Systems

Payment Method	Respondents	Percentage
UPI	18	36%
Debit / Credit Card	12	24%
Mobile Wallet	8	16%
Internet Banking	7	14%
Cash Only	5	10%
Total	**50**	**100%**

Analysis of Table

The table indicates that UPI is the most commonly used digital payment method among respondents, with 36% consumers preferring it for routine transactions. Debit and credit cards are used by 24% of respondents, while mobile wallets are preferred by 16% consumers. Internet banking services are used by 14% of participants, whereas only 10% continue to depend entirely on cash transactions.

The analysis clearly shows that consumers in Maharashtra increasingly prefer digital payment systems because of their convenience, speed, and ease of use.

Conclusion

The study analysed the impact of digital payment systems on consumer behaviour in Maharashtra and revealed that digital transactions have become an integral part of modern financial activities. Consumers increasingly prefer payment

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methods such as UPI, debit and credit cards, internet banking, and mobile wallets because they offer convenience, quick transaction processing, security, and accessibility.

The findings demonstrate that digital payment systems positively influence purchasing behaviour by encouraging online shopping, increasing the frequency of transactions, and simplifying the payment process. Consumers using digital payment methods are more likely to make faster purchasing decisions due to the ease and flexibility associated with electronic transactions.

At the same time, the study identified certain challenges, including concerns regarding cyber security, online fraud, poor internet connectivity, and lack of technical knowledge among some sections of society. Elderly consumers and individuals with limited digital literacy still face difficulties while using digital payment platforms.

The research suggests that awareness programmes, digital literacy initiatives, and secure technological infrastructure are essential for increasing consumer confidence and expanding the adoption of digital payment systems. Overall, digital payment systems have created a positive transformation in consumer behaviour and are contributing significantly to the development of a strong and sustainable digital economy in Maharashtra.

Acknowledgement

I would like to express my sincere gratitude to everyone who contributed to the successful completion of this project on **"Effect of Digital Payment Systems on Consumer Behaviour in Maharashtra."**

I am deeply thankful to my teachers, mentors, and academic guides for their valuable guidance, encouragement, and support throughout the study. Their insights and suggestions helped me understand the subject more effectively and complete this project successfully.

I would also like to thank the respondents and consumers who participated in surveys and shared their experiences regarding the use of digital payment systems. Their cooperation provided valuable information and practical perspectives that enriched this study.

My gratitude extends to various authors, researchers, journals, websites, and publications whose work served as important references for understanding digital payments, consumer behaviour, financial technology, and the evolving digital economy in Maharashtra and India.

I am grateful to my family and friends for their constant encouragement, motivation, and support during the preparation of this project. Their assistance helped me overcome challenges and stay focused on achieving my objectives.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Bulletin of Nexus
Multidisciplinary International Research Journal, Double-Blind Peer Reviewed, Open Access Journal
ISSN: 3065-7865 / Volume-3, Issue-3(II), March 2026

Original Article

E - Waste Management

A. S. Nikam[1]., A. S. Gangurde[2], V. P. Kadam[3], K. N. Pawar[4]
[1,2,3,4] Kalwan Education Society's, Arts, Commerce and Science College Kalwan (Manur)

Manuscript ID:
BN-2026-030343

ISSN: 3065-7865

Volume 3

Issue 3(II)

March 2026

Pp. 193-196

Submitted: 12 Feb 2026

Revised: 20 Feb 2026

Accepted: 20 Mar 2026

Published: 31 Mar 2026

DOI:
10.5281/zenodo.20841719
DOI link:
https://doi.org/10.5281/zenodo.20841719

Abstract:

Electronic waste (e-waste) is one of the fastest-growing waste streams globally, driven by rapid technological advancements and increasing consumer demand for electronic devices. Inefficient disposal and recycling of e-waste contribute to environmental pollution, resource depletion, and health hazards due to toxic components like lead, mercury, and cadmium. Effective e-waste management involves sustainable collection, recycling, and disposal methods, along with regulatory frameworks and consumer awareness initiatives. Circular economy approaches, including refurbishment, component recovery, and responsible manufacturing, can minimize environmental impacts and promote resource efficiency. This paper explores the challenges, policies, and innovative strategies in e-waste management, emphasizing the need for global cooperation and technological advancements to create a sustainable e-waste ecosystem.

Introduction:

Electronic waste (e-waste) refers to discarded electronic devices such as computers, smart phones, televisions, and household appliances. With the rapid advancement of technology and increasing consumer demand, e-waste has become one of the fastest-growing waste streams globally. According to reports, millions of tons of e-waste are generated annually, yet only a small percentage is properly recycled.

Effective e-waste management involves a combination of strategies, including proper collection, recycling, and disposal, as well as policies that promote extended producer responsibility (EPR), circular economy principles, and consumer awareness programs. Governments, businesses, and individuals all have a role to play in ensuring sustainable e-waste management. This paper explores the current challenges, existing regulations, and innovative solutions aimed at mitigating the environmental and social impacts of e-waste.

E-waste contains valuable materials like gold, silver, and copper, but it also harbors hazardous substances such as lead, mercury, and cadmium, which pose significant environmental and health risks if not managed properly. The improper disposal of e-waste, including land filling and informal recycling, leads to soil and water contamination, air pollution, and adverse health effects, particularly in developing countries where e-waste processing is often unregulated.

Problems:

E-waste management faces several significant challenges due to the increasing volume of electronic waste and inadequate recycling infrastructure. Some of the key problems include:

- The rapid advancement of technology and shorter product lifecycles lead to higher e- waste generation.
- A large portion of e-waste is dumped in landfills or incinerated, releasing toxic substances into the environment.
- E-waste contains harmful chemicals like lead, mercury, and cadmium, which can contaminate soil, water, and air.
- Informal recycling methods, such as open burning or acid leaching, pose severe health risks to workers and surrounding communities.
- Many countries lack proper e-waste collection and recycling facilities.

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Address for correspondence:
A. S. Nikam,Kalwan Education Society's, Arts, Commerce and Science College Kalwan (Manur)
Email: ashishnikam1988@gmail.com

How to cite this article:
Nikam, A. S., Gangurde, A. S., Kadam, V. P., & Pawar, K. N. (2026). E - Waste Management. Bulletin of Nexus Journal, 3(3(II)), 193–196. https://doi.org/10.5281/zenodo.20841719

Quick Response Code:

Website: https://bnir.us

Objectives:

Effective e-waste management aims to minimize the environmental and health risks associated with electronic waste while promoting resource efficiency and sustainability. The key objectives include:

- It reduce the negative impact of hazardous substances in e-waste on soil, water, and air.
- It prevent pollution caused by improper disposal, such as open burning and land filling.
- Promote the recovery of valuable materials like gold, silver, copper, and rare earth metals.
- Reduce dependency on raw material extraction by encouraging reuse and recycling.
- Ensure the proper handling, transportation, and disposal of non-recyclable e-waste.

Scope:

E-waste management encompasses a wide range of activities, from collection and recycling to policy development and sustainable practices. Its scope includes environmental, economic, technological, and regulatory aspects that contribute to minimizing the negative impacts of electronic waste.

- Reducing pollution due to hazardous substances in e-waste, such as lead & mercury.
- Promoting eco-friendly recycling techniques to prevent soil, air, and water contamination. Encouraging sustainable waste management practices to support a circular economy.
- Advancing recycling technologies to improve the recovery of valuable materials like gold, silver, and rare earth metals.
- Promoting the development of eco-design in electronic products to enhance recyclability.

Limitations:

E-waste management faces several limitations, including:

- Many countries, especially developing ones, lack adequate recycling facilities.
- Limited collection centers and proper disposal mechanisms hinder efficient management.
- Advanced technologies required for safe recycling are not always available.
- E-waste contains hazardous materials like lead, mercury, and cadmium.
- Lack of incentives discourages responsible e-waste disposal.

Data and Research Methodology :

Secondary Data Sources

- Government Reports & Policies: Data from environmental agencies, waste management authorities, and regulatory bodies on e-waste statistics and policies.
- Industry Reports & Market Studies: Published research from organizations like the World Economic Forum (WEF), International Telecommunication Union (ITU), and Global E-Waste Monitor.
- Academic Research Papers: Studies on e-waste generation, recycling technologies, and policy effectiveness.

Statistics :

Global E-Waste Statistics

- Generation: In 2019, the world produced a record 53.6 million metric tons (Mt) of e-waste, marking a 21% increase over five years. Projections indicate that by 2030, this figure will reach 74 Mt, nearly doubling within 16 years.
- Recycling Rates: Only 17.4% of e-waste generated in 2019 was collected and recycled, leaving the majority improperly managed.
- Valuable Materials: The unrecycled e-waste in 2019 contained precious metals like gold, silver, and copper, valued at approximately $57 billion.
- **E-Waste in India**
- Major Contributors: Maharashtra, Tamil Nadu, and Andhra Pradesh are among the top e-waste generating states.
- Urban Concentration: Over 60% of India's e-waste is produced by 65 cities, with metropolitan areas like Mumbai, Delhi, and Bangalore being significant contributors.

Recycling Initiatives and Challenges

Despite the presence of valuable materials in e-waste, recycling rates remain low. In the U.S., only about 12% of small electronics are recycled. Challenges include inadequate recycling infrastructure, lack of consumer awareness, and the complexity of electronic devices.

In India, the growth of clean energy technologies, such as electric vehicles and solar panels, presents new e-waste challenges. Recycling initiatives are emerging to address potential waste from these technologies, aiming to recover valuable materials and reduce environmental impact.

Results :

Based on global and regional e-waste data, the following key findings have emerged:

a. Increasing E-Waste Generation

- Global e-waste production reached 53.6 million metric tons (Mt) in 2019, with a projected increase to 74 Mt by 2030.
- India is among the top five e-waste-generating countries, producing over 3.2 Mt annually.

b. Low Recycling Rates

- Only 17.4% of global e-waste was recycled in 2019, leaving valuable materials wasted.
- Informal e-waste recycling dominates in countries like India, leading to health and environmental risks due to unsafe dismantling processes.

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c. Valuable Materials and Economic Loss

- e-waste contains $57 billion worth of recoverable metals, like gold, silver, and copper.
- Lack of proper collection and recycling infrastructure leads to loss of valuable resources.

d. Health and Environmental Impacts

- Improper disposal methods, such as open burning and acid leaching, release toxic substances (lead, mercury, cadmium) into the environment.
- E-waste pollution contributes to soil degradation, water contamination, and air pollution, especially in informal recycling hubs.

Discussion :

a. Challenges in E-Waste Management

1. Lack of Consumer Awareness – Many consumers are unaware of proper e-waste disposal methods.
2. Weak Regulations and Enforcement – Some countries lack strict e-waste laws, and enforcement is often inadequate.
3. High Cost of Recycling Infrastructure – Setting up advanced e-waste recycling plants requires significant investment and technical expertise.

b. Potential Solutions

1. Extended Producer Responsibility (EPR): Governments should mandate manufacturers to take back and recycle their products.
2. Investment in Formal Recycling Infrastructure: Developing advanced facilities for safe and efficient recycling of e-waste.

Findings:

The analysis of e-waste management has revealed several critical insights regarding global e-waste generation, recycling efficiency, environmental impact, and policy effectiveness.

1. Global E-Waste Generation is Rising Rapidly

- 53.6 million metric tons (Mt) of e-waste were generated worldwide in 2019, with projections reaching 74 Mt by 2030.
- The main contributors are developed nations and rapidly industrializing countries like China, the U.S., and India.

2. Low E-Waste Recycling Rates

- Only 17.4% of global e-waste was formally collected and recycled in 2019.
- A significant portion of e-waste is improperly disposed of, ending up in landfills
- The informal recycling sector dominates in developing countries, leading to health risks due to unsafe dismantling techniques.

3. Economic Loss Due to Un-recycled E-Waste

- E-waste contains valuable metals such as gold, silver, platinum, and copper, estimated to be worth $57 billion annually.
- Poor recycling leads to resource wastage, increasing the demand for virgin materials.

4. Significant Environmental and Health Hazards

- E-waste contains toxic substances like lead, mercury, cadmium, and brominated flame retardants, which contaminate soil, water, and air.
- Informal recycling hubs, such as those in Guiyu, China, and Agbogbloshie, Ghana, suffer from severe pollution and worker health issues.

5. Regulatory Challenges and Policy Gaps

- Many countries lack strict regulations on e-waste disposal and recycling.
- Even in regions with regulations, enforcement remains weak, leading to illegal dumping and cross-border movement of e-waste.

6. Consumer Awareness and Participation is Limited

- Consumers are unaware of proper disposal methods and available recycling programs.
- Take-back programs and manufacturer responsibility initiatives have low participation rates in many countries.

Conclusion on E-Waste Management

- E-waste management is a growing global challenge due to the rapid increase in electronic consumption and disposal.
- The findings indicate that while e-waste generation is rising at an alarming rate, recycling efforts remain inadequate, leading to significant environmental, health, and economic consequences.
- The low recycling rates and informal processing of e-waste contribute to pollution, resource wastage, and hazardous working conditions.
- Toxic substances found in e-waste contaminate soil, water, and air, affecting both human and environmental health. Despite the presence of valuable materials like gold, silver, and copper in electronic waste, poor collection and inefficient recycling result in economic losses worth billions of dollars annually.
- Governments, manufacturers, and consumers must work together to ensure proper collection, recycling, and disposal methods.

Recommendations for Effective E-Waste Management

To address the growing e-waste crisis, a multi-faceted approach is required, involving governments, businesses, and consumers. The following recommendations focus on sustainable and efficient e-waste management practices.

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- Implement Extended Producer Responsibility (EPR) laws, requiring manufacturers to take back and recycle their products.
- Establish strict penalties for illegal e-waste dumping and improper disposal.
- Invest in advanced recycling facilities to improve material recovery rates.
- Develop public-private partnerships to fund and scale up recycling operations.
- Develop repair and refurbishment programs to extend product usability and reduce waste.
- Implement buy-back and trade-in programs to incentivize responsible disposal.
- Provide easy access to e-waste collection centers and disposal points.
- Set up efficient e-waste collection networks in urban and rural areas.
- Support research into environmentally friendly disposal methods to minimize pollution.
- Develop AI and automation-based sorting systems to improve recycling efficiency.
- Encourage businesses to adopt zero-waste policies and track their e-waste footprint.

Acknowledgement

I would like to express my sincere gratitude to everyone who helped and supported me in completing this project on **"E-Waste Management."** I am deeply thankful to my teachers and guides for their valuable guidance, encouragement, and constructive suggestions throughout the preparation of this project. Their knowledge and support helped me gain a better understanding of the importance of managing electronic waste responsibly.

I would also like to thank various authors, researchers, books, journals, websites, and other reference sources that provided useful information and insights on e-waste generation, its environmental impact, recycling methods, and sustainable waste management practices.

My heartfelt appreciation goes to my parents, family members, and friends for their continuous encouragement, motivation, and support during the completion of this project.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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