InSight Bulletin: A Multidisciplinary Interlink International Research Journal
Peer Reviewed International, Open Access Journal.
ISSN : 3065-7857 / Website: https://ibrj.us / Volume-2, Issue-10 / October - 2025

Original Article

A study on "Reimagining India's Development: IoT and Industry 4.0 in the Vision of Viksit Bharat 2047

Pawar Sonam Mohan
Assistant Professor, Department of Accountancy,
D. G. Tatkare Arts and Commerce College, Tala. Tal. Tala, Dist. Raigad

Manuscript ID:
IBMIIRJ -2025-021037

Submitted: 12 Sept. 2025

Revised: 17 Sept. 2025

Accepted: 17 Oct. 2025

Published: 31 Oct. 2025

ISSN: 3065-7857

Volume-2

Issue-10

Pp. 160-163

October 2025

Correspondence Address:
Pawar Sonam Mohan
Assistant Professor, Department of Accountancy, D. G. Tatkare Arts and Commerce College, Tala. Tal. Tala, Dist. Raigad
Email: pawarsonam184@gmail.com

Quick Response Code:

Web. https://ibrj.us

DOI: 10.5281/zenodo.17621463

DOI Link:
https://doi.org/10.5281/zenodo.17621463

Abstract

This research paper focuses on the vision of "Viksit Bharat @ 2047", which aims to make India a developed nation by 2047. It discusses how IoT (Internet of Things) and Industry 4.0 can play an important role in transforming and reimagining India's development journey. Through a multidisciplinary approach, the paper examines key pathways to achieving this vision, encompassing economic growth, technological innovation, social equity, and environmental sustainability. Industry 4.0 is the integration of advanced technologies like IoT, automation, and data analytics to create smarter, more connected manufacturing and business processes. This research study aims to contribute to the discourse on India's future and outline a roadmap for achieving a developed nation status by 2047. This research paper delves into the pathways to realizing the vision of Viksit Bharat @2047. It explores the strategic interventions required across various sectors, examines the challenges and opportunities. Hence, they can improve life quality and yield significant personal, professional and economic opportunities and benefits in the near future. It enhances efficiency by improving resource allocation, reducing downtime, increasing productivity, and streamlining workflows.

Keywords: *Internet of Things, Digital Transformation, Iindustry 4.0, Business Strategy, Healthcare, Sustainable development, Viksit Bharat.*

Introduction

India has made remarkable progress over the past 75 years. The vision of Viksit Bharat @ 2047 outlines the country's goal of becoming a fully developed nation by the 100th year of independence. This vision focuses on innovation, inclusion, and sustainable growth as the key pillars of development. India is now entering a new industrial era driven by Industry 4.0 and digital transformation. This digital revolution is changing traditional industries, improving productivity, and creating smarter and more efficient systems. Although the adoption of Industry 4.0 and IoT is still in its early stages, these technologies offer modern solutions that can optimize energy use, minimize waste, and promote eco-friendly designs through automation and data insights. With initiatives like Digital India, make in India, and Viksit Bharat 2047, IoT is emerging as a foundation for India's economic and industrial transformation.

What is IoT?

Internet of Things (IoT) refers to a network of interconnected devices embedded with sensors, software and technology to collect, exchange, and analyze data. IoT is regarded as a dynamic and global network of interconnected "things" uniquely addressable, based on standard and interoperable communication protocols and with self- configuring capabilities.

What Is Industry 4.0?

Industry 4.0, also known as the 'Fourth Industrial Revolution' represents the convergence of cyber-physical systems, IoT (Internet of Things), Artificial Intelligence (AI) robotics, big data analytics and cloud computing into manufacturing and production. Over the last decade, India has embraced this transformation, especially in sectors like Manufacturing, information technology, agriculture, logistics, and public Sservices.

Review of Literature: The different aspects of Commerce and Management education have been covered by several scholars.

How to cite this article:
Mohan, P. S. (2025). A study on "Reimagining India's Development: IoT and Industry 4.0 in the Vision of Viksit Bharat 2047. InSight Bulletin: A Multidisciplinary Interlink International Research Journal, 2(10), 160–163. https://doi.org/10.5281/zenodo.17621463

It is widely discussed in various researchers' publications some of them have been reviewed in this section.

1. Zelal Gültekin Kutlu - In her research article "Industry 4.0 and the Internet of Things (IoT)" explore the impact of technological development on industrial revolutions and examine Industry 4.0 and IoT together are transforming industries into smarter, more connected, and more sustainable systems.

2. K. Schwertner – In his research article "Digital Transformation of Business," K. Schwertner explained digital transformation is a continuous process that helps businesses respond to changing environments. He emphasized that the ability to adapt quickly and effectively to these changes is a key factor for success in the global market. Schwertner also highlighted that the world economy is shifting towards a digital economy, driven by advancements such as cloud computing, big data analytics, mobile and broadband technologies, e-commerce, social media, smart sensors, and the Internet of Things (IoT).

3. Sonu Gangwar and Dr. Ram Ratan - In their research article "Vision of Viksit Bharat 2047: Opportunities and Challenges," they discuss key areas such as economic growth, social progress, environmental sustainability, and good governance as essential pillars for India's development. They emphasize that a strong and effective education system can help address many problems and challenges that hinder India's journey toward becoming a developed nation.

Objectives of Research: This paper emphasizes on the following objectives.

1. To understand the concept of Internet of Things (IoT) and Industry 4.0.
2. To analyse the role of Internet of Things (IoT) in India's economic and industrial development.
3. To identify the opportunities and challenges of implementing IoT and Industry 4.0 in different sectors of the Indian economy.
4. To evaluate the potential impact of smart technologies on employment, productivity, and sustainability.
5. To suggest strategies for effective adoption of IoT and Industry 4.0 in India's growth journey.

Research Methodology:

The present study is descriptive nature. This study is based on the secondary data. The secondary data like research articles, government reports, reference books, websites, Journals are utilized for the present study.

Role of Internet of Things (IoT) in India's economic and industrial development –

1. Manufacturing (Industry 4.0): IoT is driving the rise of smart factories through automation, robotics, and predictive maintenance. It improves efficiency, ensures better quality control, and minimizes downtime. For instance, Tata Motors and Mahindra use IoT for supply chain management and vehicle diagnostics.

2. Agriculture (Smart Farming): IoT sensors support precision farming by monitoring soil, forecasting weather, and controlling irrigation. This helps reduce water usage, increase crop yields, and strengthen food security. Startups like Fasal are using IoT to help farmers optimize production.

3. Healthcare (Digital Health & Telemedicine): IoT-powered devices such as wearables, remote monitoring systems, and telehealth platforms expand access to healthcare, especially in rural India. They enable early diagnosis, reduce hospital overcrowding, and make treatment more affordable. Hospitals like AIIMS and Apollo apply IoT for patient monitoring.

4. Energy & Utilities: IoT strengthens energy management through smart grids, smart meters, and renewable energy integration. It improves efficiency, cuts transmission losses, and promotes sustainability. A key example is India's smart meter projects under the UDAY scheme.

5. Logistics & Transportation: IoT enhances logistics by enabling fleet tracking, route optimization, and smart traffic systems. This boosts supply chain efficiency and lowers transportation costs. For example, Indian Railways is implementing IoT for predictive maintenance of engines and coaches.

6. Urban Development (Smart Cities Mission): IoT contributes to urban growth through smart street lighting, waste management, surveillance, and water systems. It improves public services, reduces pollution, and enhances quality of life. Cities like Pune, Bhopal, and Hyderabad have adopted IoT solutions for better governance.

Opportunities of Implementing IoT and Industry 4.0 in Different Sectors of the Indian Economy –

1. Manufacturing Sector - The manufacturing sector is rapidly evolving with IoT, turning traditional methods into smart systems. Robots, sensors, and IoT devices improve production speed and accuracy, while predictive maintenance reduces downtime. Automation further enhances cost efficiency and productivity. However, challenges remain, including high investment costs for MSMEs, a shortage of skilled workers, and cybersecurity risks to industrial data.

2. Agriculture Sector - In the agriculture sector, IoT plays a vital role through sensors that provide real-time data on soil, water, and weather conditions, while drones and IoT devices help monitor crop health more effectively. These technologies enable better use of resources like water, fertilizers, and seeds, improving productivity and sustainability. However, challenges such as poor internet connectivity in rural areas, lack of awareness and training among farmers, and the high cost of IoT devices make adoption difficult, especially for small farmers.

3. Healthcare Sector - In the healthcare sector, IoT helps in real-time monitoring of vital signs like heart rate and blood sugar levels, while remote monitoring enables doctors to treat patients in rural areas from a distance. AI-based diagnostics also improve the speed and accuracy of disease detection. However, the sector faces challenges such as risks to patient data privacy, inadequate IoT infrastructure in rural hospitals, and the high cost of advanced medical devices and software.

4. Transport & Logistics - In the transport and logistics sector, IoT with GPS-enabled trucks and buses improves fleet management, while real-time tracking helps reduce delays and makes supply chains more efficient. Sensors also support route optimization, leading to better fuel efficiency and cost savings. However, the sector faces challenges such as difficulties in integrating IoT with outdated systems, risks of data misuse due to cybersecurity threats, and the high cost of implementation.

5. Smart Cities / Utilities- In smart cities and utilities, IoT enables efficient electricity management, improves traffic flow through smart traffic systems, and makes waste collection more effective with sensor-based solutions. However, the sector faces

challenges such as the absence of unified policies and regulations, high maintenance costs for operating smart systems, and interoperability issues where devices from different companies may not work seamlessly together.

Challenges of the implementation of Industry 4.0 - IoT not only aims at transforming industries and increasing their productivity but also at adding value to the core purpose of enterprises and mitigating the weaknesses caused by legacy systems.

• lack of courage to drive the radical changes required and a shortage of skilled talent to implement it effectively.

• Companies often struggle to build a strong business case to justify the high investment in Industry 4.0 IT infrastructure.

• Poor coordination among organizational units such as R&D, IT, manufacturing, sales, and finance further complicates **implementation due to weak internal collaboration.**

• Challenge with Cybersecurity concerns arise when involving third-party technologies or implementation partners, along with issues related to data ownership.

• Challenge with uncertainty regarding whether to insource or outsource, coupled with limited knowledge about reliable service providers.

• Challenges with integrating data from diverse and disconnected sources remains a significant challenge for enabling Industry 4.0 applications.

Impact of smart technologies on employment, productivity, and sustainability -

a) Impact on Employment -

The implementation of smart technologies has profoundly influenced employment patterns. While automation and AI can replace repetitive and routine tasks, particularly impacting low-skill roles in manufacturing, logistics, and administrative sectors, they also generate new opportunities in fields like AI management, IoT maintenance, data analytics, and cybersecurity. This shift increases the demand for skilled professionals who can oversee and optimize these advanced systems. As a result, employees need to adapt through upskilling and reskilling to remain relevant in the workforce. For example, Germany's Industry 4.0 smart factories have reduced the need for manual assembly work while creating greater demand for engineers and IT experts.

b) Impact on Productivity -

The adoption of smart technologies has greatly enhanced industrial productivity. IoT-enabled machinery and AI-driven analytics improve operational efficiency and accuracy, reducing errors and minimizing downtime. Predictive maintenance using smart sensors helps identify potential issues early, preventing expensive production interruptions. Automation further optimizes the use of materials, energy, and labor, ensuring resources are efficiently managed. Moreover, access to real-time data allows managers to make quicker and more informed decisions. For example, Tata Motors leverages IoT in its supply chain to monitor vehicle production, resulting in increased throughput and fewer delays.

c) Impact on Sustainability

Smart technologies significantly contribute to sustainability. IoT-enabled energy management and smart grids help industries and cities reduce energy wastage, improving efficiency. Environmental monitoring through sensors tracks pollution, water quality, and emissions, allowing businesses and governments to limit their environmental impact. Intelligent and automated systems optimize resource use, minimizing material waste, while IoT sensors in agriculture ensure precise soil and water management, reducing overuse of fertilizers and water. For instance, smart meters implemented under India's UDAY scheme help monitor energy consumption and enhance efficiency, supporting sustainable development.

Strategies for effective adoption of IoT and Industry 4.0 in India's growth -

1. Infrastructure Enhancement: Build strong internet and 5G networks, along with cloud computing systems, in both cities and rural areas. Set up IoT-ready industrial zones and smart factories to enable automation and smooth data sharing.

2. Skill Development and Training: Implement nationwide programs to train and upgrade workers' skills in AI, IoT, robotics, and data analytics. Work with universities, technical institutes, and companies to create Industry 4.0-focused courses and hands-on training.

3. Government Policies and Incentives: Provide financial aid, tax breaks, and subsidies to help small and large businesses adopt smart technologies. Establish rules to protect data, ensure privacy, and enable systems to work together. Encourage collaboration between the government and private companies to speed up technology adoption.

4. Research and Innovation: Support local research and development in AI, robotics, IoT, and smart manufacturing. Encourage innovation hubs, startup incubators, and collaboration between industries and universities to create technologies suited for India.

5. Cybersecurity and Data Management: Put strong cybersecurity measures in place to protect industrial systems and sensitive data. Set clear rules for data ownership, storage, and sharing, especially when working with third-party providers.

6. Integration and Interoperability: Use standard protocols and platforms to ensure IoT devices and systems work well together. Focus on modular and scalable solutions so adoption can happen gradually without overhauling everything at once.

7. Sustainability and Smart Practices: Use energy-efficient IoT systems, smart grids, and optimized resource management to support sustainable development. Encourage eco-friendly manufacturing and circular economy practices with smart technologies.

Case Studies -

The Digital Transformation in various areas Examining successful startups both in India and globally provides practical insights into innovation, scaling strategies, business model design, and ecosystem utilization. These case studies demonstrate how technology, customer focus, and visionary leadership can transform industries and contribute to economic and social development.

1.BYJUs (India) - BYJU's began as a small coaching business in India, offering personalized learning for students. By using mobile technology, gamified content, and AI-driven adaptive learning, it transformed the edtech sector. The company expanded rapidly through acquisitions of international edtech firms like Osmo and WhiteHat Jr, reaching over 150 million users worldwide,

including underserved regions. BYJU's shows that education startups can succeed by combining technology, innovative content, and global expansion while addressing local learning needs.

2.Ather Energy (India) - Ather Energy is driving green mobility in India with smart electric scooters and charging infrastructure. Its scooters feature connected dashboards, real-time navigation, and AI-based performance optimization. By promoting clean energy, reducing pollution, and building EV infrastructure, Ather competes with traditional two-wheelers while offering superior user experience. The company demonstrates that sustainable startups can succeed by integrating technology, design, and infrastructure for scalable solutions.

3. Tesla (USA) - Tesla, a global leader in clean-energy innovation, has transformed the automotive industry. Under Elon Musk's visionary leadership, the company focuses on accelerating the world's transition to sustainable energy. Tesla pioneered electric vehicles, advanced battery technology, and autonomous driving solutions, while effective marketing, production scaling, and international expansion established it as a global EV leader. The company illustrates that visionary leadership, innovation, and strategic global positioning can help startups disrupt traditional industries.

4. Canva (Australia) - Canva revolutionized graphic design by making it simple and accessible. Its cloud-based platform offers freemium and subscription options, allowing users of all skill levels to create professional designs. Serving over 100 million users in more than 190 countries, Canva demonstrates the scalability of intuitive software. By simplifying complex design tools and adding collaborative features, it appeals to businesses, educators, and individuals. The platform shows that user-focused design and global scalability can help tech startups expand beyond domestic markets.

5. Stripe (USA) - Stripe has revolutionized online payments by making digital financial systems simple and accessible for businesses worldwide. Its APIs let startups and companies easily integrate payment solutions. By supporting thousands of startups, Stripe streamlines cross-border transactions and facilitates rapid growth. Its transaction-based revenue model grows with user adoption, ensuring sustainability. This example shows that fintech startups can strengthen the ecosystem by building scalable platforms and infrastructure that support other businesses.

Conclusion:

This present paper highlights that the Internet of Things (IoT) is not merely a technology but a crucial driver of India's economic growth and industrial transformation. Across sectors such as agriculture, manufacturing, healthcare, and smart cities, IoT enhances efficiency, productivity, and innovation, positioning India as a leader in the global digital landscape. Industry 4.0 enables machines to operate as intelligent, independent systems capable of collecting, analyzing, and acting on data without human intervention. It introduces features like self-maintenance, self-optimization, self-learning, and self-customization, adding a new level of intelligence to industries. This revolution helps businesses remain competitive in global markets and adapt to the constantly evolving needs and expectations of customers.

Acknowledgment

The author expresses sincere gratitude to the Principal and Management of D. G. Tatkare Arts and Commerce College, Tala (Raigad) for their continuous encouragement and academic support in carrying out this research work. Heartfelt thanks are extended to the Department of Accountancy for providing a conducive environment and necessary resources to complete this study successfully.

The author also acknowledges the valuable insights and constructive suggestions received from colleagues and peers, which greatly contributed to improving the quality of this paper. Finally, special appreciation is offered to family members and friends for their constant motivation, patience, and moral support throughout this research journey.

Financial support and sponsorship

Nil.

Conflicts of interest

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

References:

1. https://www.phdcci.in/wp-content/uploads/2024/04/Viksit-Bharat@2047-A-Blueprint-of-Micro-and-Macro-Economic-Dynamics.pdf
2. Suthar, S. R. (2024). Setting Up the Foundation for a Sustainable and Electrified Nation with Viksit Bharat@ 2047. Vidhyayana-An International Multidisciplinary Peer-Reviewed E-Journal-ISSN 2454-8596, 9(si2).
3. Mahida, R. G. (2024). A Leading the Way: Sustainable Development and Economic Dynamics in Viksit Bharat@ 2047. Vidhyayana-An International Multidisciplinary Peer-Reviewed E-Journal-ISSN 2454-8596, 9(si2). AHIR, D. M. (2024).
4. Bhardwaj, S., Jain, L., & Jain, S. (2010). Cloud computing: A study of infrastructure as a service (IAAS). International Journal of engineering and information Technology, 2(1), 60-63.
5. Entrepreneurship and Start-Up Ecosystem: A Vision for Viksit Bharat@ 2047. Vidhyayana-An International Multidisciplinary Peer-Reviewed E-Journal-ISSN 2454-8596, 9(si2).
6. The National Policy on Education (NPE) 2020 – Ministry of Education, Government of India. (2020). National Education Policy 2020.
7. Atmanirbhar Bharat: A Vision for Economic Self-Reliance – Ministry of Finance, Government of India. (2020). Atmanirbhar Bharat Policy.
8. www.youtube.com
9. www.wikipidia.com