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Research Article

Exploring The Transition from Industry 4.0 To 5.0 – Its Implication And Application In Banking Industry

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ABSTRACT

The banking sector is on the precipice of a profound transformation, marked by the transition from Industry 4.0 to the emerging era of Industry 5.0. Rapid digitalization in the banking industry has forced banks to thoroughly reevaluate their previous business models, which means they must respond fast and effectively to customer needs while providing user-friendly, secure services. Banks have created cutting-edge banking services and goods over the past few years, including protected systems that dependably protect client data and money. Security and trust are still crucial factors in banking. In this research paper, we will study valuable insights into the shift from Industry 4.0 to 5.0 in the banking sector. We will also assess the technological advancements that have revolutionized banking operations and customer interaction and also the consequences, difficulties, and innovations connected with the implementation of Industry 5.0 in banking sector.

Keywords: Industry 4.0 to 5.0, Banking 5.0, Innovative Banking Services, Industry 5.0, Digitalisation

INTRODUCTION

In the modern era, the relentless march of technology has continually reshaped the global economic landscape, compelling industries to adapt and evolve in the face of rapid change. As we stand on the precipice of Industry 4.0's full integration into the fabric of business and society, a new paradigm is emerging - Industry 5.0. In this dynamic landscape, industries must not merely keep pace with technological innovations, but also embrace a more profound transformation that transcends digitalization and automation.

The banking industry, as a cornerstone of modern economies, stands as an exemplar of such transformation. Industry 4.0 witnessed a remarkable shift in banking, as artificial intelligence, data analytics, and digital interfaces revolutionized services, from customer interactions to risk assessment. However, Industry 5.0 beckons with a vision that transcends mere technological advancement. This new era emphasizes a reinvigorated partnership between humans and machines, fostering sustainability, and championing ethical technology deployment. The transition from Industry 4.0 to 5.0 in the banking sector presents multifaceted implications and applications that warrant comprehensive exploration.

The first industrial revolution (Industry 1.0), which occurred in the eighteenth century, resulted in a substantial transformation by enabling machines to produce items utilizing newly developed methods and techniques. It started in England in 1760 and by the end of the eighteenth century; it had reached the United States. Industries like mining, textile, agriculture, glass, and others were affected by Industry 1.0, which saw a shift from a handcraft economy to one dominated by automation. Industry 2.0, which promoted the fast interchange of people and innovative ideas, was a following transition that occurred in the industrial sector between 1871 and 1914. As business productivity increases and machines replace factory workers throughout this revolution's period of economic boom, unemployment rates increased.

The digital revolution, also known as Industry 3.0, began in the 1970s of the 20th century as a result of the automation of memory-programmable controls and computers. The usage of digital logic, integrated circuit chips, mass production, and related technologies—including computers, digital cellular phones, and the

internet—are the focal points of this particular phase. Traditional goods and business practices are changing as a result of technological developments. Technology is being converted to digital format thanks to the digital revolution. Industry 4.0 unites physical assets with cutting-edge technologies like artificial intelligence, the Internet of Things, robots, 3D printing, noisy computing, etc. Organizations that have implemented Industry 4.0 are adaptable and ready to make decisions based on data. Industry 5.0 is a new technology from the previous generation created for effective and intelligent machine.

REVIEW OF LITERATURE

Adel, A. (2022). "Future of industry 5.0 in society: Human-centric solutions, challenges and prospective research areas" concluded that Industry 5.0 will decrease emphasis on technology and assume that the potential for progress is based on collaboration among humans and machines.
Mehdiabadi, A., Shahabi, V., Shamsinejad, S., Amiri, M., Spulbar, C., & Birau, R. (2022). "Investigating Industry 5.0 and its impact on the banking industry: Requirements, approaches and communications" Concluded that Industry 5.0 represents a significant shift from mass automation to the capability enhancement process, where human resources move to the next level to achieve personalization processes by product customization.

Pan, S. (2022)."Paradigm Shift in Indian Banking System-Banking 5.0" concluded that to overcome economic challenges, banks need to embrace digital technologies and innovation to stay competitive and meet the evolving needs of customers.
Kaur, D. N., Sahdev, S. L., Sharma, D. M., & Siddiqui, L. (2020). "Banking 4.0: 'the influence of artificial intelligence on the banking industry & how AI is changing the face of modern day banks" concluded that AI in banking is considered beneficial by the majority of respondents, improving speed of services and security. The article concludes that AI is transforming the banking industry, attracting more customers and enabling modern banks to grow and expand.
Mehdiabadi, A., Tabatabeinasab, M., Spulbar, C., Karbassi Yazdi, A., & Birau, R. (2020). "Are we ready for the challenge of Banks 4.0? Designing a roadmap for banking systems in Industry 4.0" concluded that the need for banks to embrace digital technologies, collaborate with FinTechs, and work towards creating value by synergizing their strengths and banks also must change their thinking and keep up with technological advancements to remain competitive in the evolving banking landscape.
Mekinjić, B. (2019). "The impact of industry 4.0 on the transformation of the banking sector" concluded that the digitalization process in banking is reshaping the industry and providing new opportunities for banks to improve efficiency, enhance customer experiences, and expand their services and also important for banks to address challenges such as cyber security and ensure that customers have the necessary financial literacy to navigate the digital landscape.
Pogăciaş, C., & Dovleac, R. (2021). "Implementation and impact of Industry 4.0 and Quality 4.0 in the banking sector" concluded that despite the accelerated digitization processes, both in banking and in other fields, the human factor will continue to play a key role in the future, and the focus will continue to be the trust, security and customer of the bank.

Noreen, U., Shafique, A., Ahmed, Z., & Ashfaq, M. (2023). "Banking 4.0: Artificial intelligence (AI) in banking industry & consumer's perspective" concluded that factors like awareness, attitude, subjective norms, perceived usefulness, and knowledge of AI technology have a positive relationship with the intention to adopt AI in the banking sector. However, perceived risk has a negative but significant relationship with the intention to adopt AI.

OBJECTIVES OF THE STUDY

- To observe the transition from industry 4.0 to 5.0 in banking sector
- To explore the possibilities of implementing industry 5.0 in banking sector

THE TRANSITION FROM INDUSTRY 4.0 TO 5.0 IN BANKING SECTOR

1. INDUSTRY 5.0

The Fifth Industrial Revolution, or Industry 5.0, is a new and developing stage of industrialization in which humans collaborate with cutting-edge machinery and robots with artificial intelligence to improve business operations. This is combined with a stronger emphasis on the needs of people, more resilience, and a better understanding of sustainability.

Source: I-Scoop

This new phase, which extends beyond manufacturing and builds on Industry 4.0, is made possible by technological advancements in the areas of artificial intelligence, automation, big data analytics, the Internet of Things (IoT), machine learning, robotics, smart systems, and virtualization.

The European Union describes Industry 4.0, which expands on the ideas of the last industrial revolution, as offering "a vision of industry that aims beyond efficiency and productivity as the sole goals and reinforces the role and contribution of industry to society." This is a key distinction from Industry 4.0's methodology, which the EU describes as "putting the wellbeing of the worker at the centre of the production process and using new technologies to provide prosperity beyond jobs and growth while respecting the production limits of the planet."

This marks a change from a concentration on economic value to a more inclusive idea of societal worth and welfare. Despite the fact that this idea has previously been discussed, for instance through Corporate Social Responsibility, the idea of putting people and the environment before profits shifts the attention of business. Industry 5.0, on the other hand, expands the concept of industry to include all organisations and business strategies in order to provide a more comprehensive view than that of Industry 4.0.

2. Transformation of Industry From 1.0 TO 5.0

INDUSTRY 1.0

The First Industrial Revolution, often known as Industry 1.0, was a turning point in human history. It signalled the change from rural to industrialised economies. The steam engine, mechanised spinning and weaving, and the use of water and steam power to operate equipment were among the major breakthroughs. The factory system, greatly increased productivity, and a significant change in the nature of work were all results of Industry 1.0.

Source: Zinnov

INDUSTRY 2.0

More technological advancements were made during the Second Industrial Revolution, such as the internal combustion engine and electricity. Assembly lines and mass production methods were developed during this time period, which enabled the mass manufacture of items. The shift to Industry 2.0 brought about the electrification of society, more efficiency in transportation, and the emergence of industries focused on consumers.

INDUSTRY 3.0

The Third Industrial Revolution, often known as the Digital Revolution, was the catalyst for the development of computers, automation, and information technology. Increased connectivity, the internet, and the widespread use of computers in businesses and residences were all made possible by the shift to Industry 3.0. Automation and digitization have become more prevalent over this time period.

INDUSTRY 4.0

The Fourth Industrial Revolution, often known as Industry 4.0, is characterised by the fusion of big data, artificial intelligence, digital technology, and the Internet of Things (IoT). With a focus on smart manufacturing, data-driven decision-making, and networked systems, it marks a significant transformation in how industries operate. In order to increase production and efficiency, this period makes use of technology like 3D printing, cloud computing, and sophisticated robotics.

INDUSTRY 5.0

Industry 5.0 represents a vision for the future that emphasizes human-machine collaboration, particularly in areas where human creativity, intuition, and empathy are irreplaceable. In this era, technology is leveraged to augment human capabilities, fostering sustainable and ethical development. The transition to Industry 5.0 envisions an era of co-working between humans and machines in areas like healthcare, education, and advanced problem-solving.

3. OVERVIEW OF BANKING 1.0 TO 5.0

A remarkable journey of technical innovation and evolution in the banking and financial services sector can be seen in the shift from Banking 1.0 to Banking 5.0. These financial eras are summarised here.

Banking 1.0

The first generation of banking was known as banking 1.0. Banks provided basic services like currency exchange, loans, and deposits in this largely manual and regional economy. Paper-based transactions predominated, and local communities were the focus of banking. During this time, banking was mostly a brick-and-mortar industry.

Banking 2.0
Technological advances like the telephone and telegraph were introduced during the 2.0 Era. This made it possible for banks to communicate with one another and for services to be offered outside of local areas. The era was characterised by the creation of national banking systems, cheque clearing, and central banks.

Banking 3.0
The Third Generation was dominated by the extensive use of computers and the automation of numerous financial procedures. The creation of electronic payment methods, such as credit cards and ATMs, resulted from this. Additionally, at this time, multinational financial institutions and the globalisation of banking both emerged.

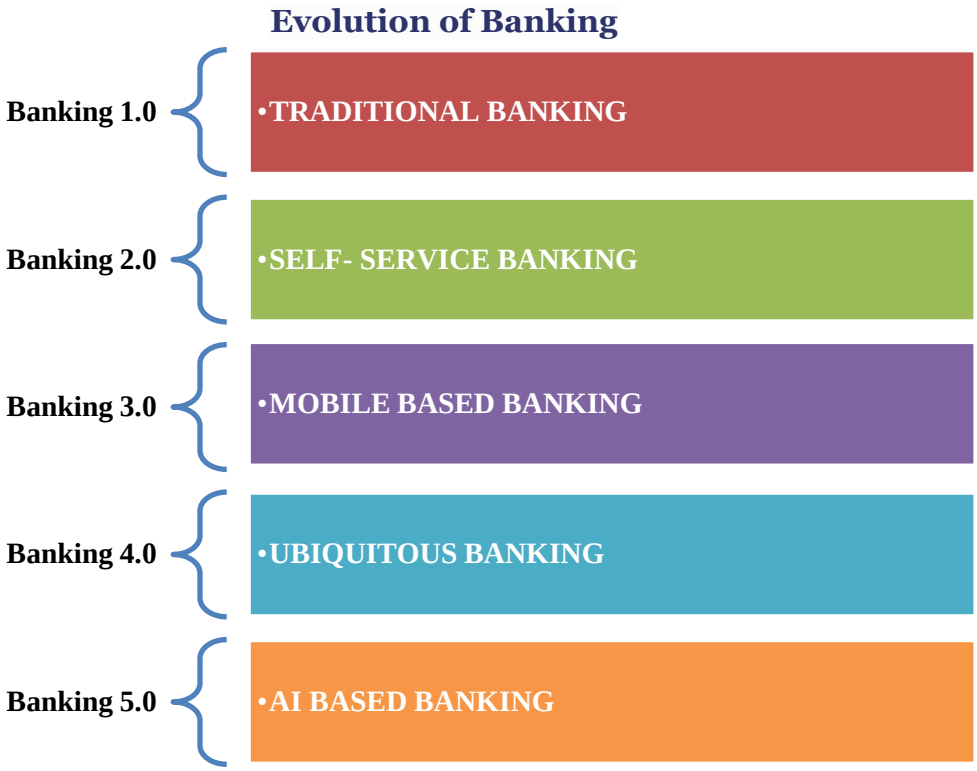


Fig.1 Source: Author's own creation

Banking 4.0
The rise of Internet banking and the expansion of web-based financial services ushered in the "Banking 4.0," or "Digital Banking Era." Online account access, transaction processing, and investment management are now available to customers. Data analytics and mobile banking apps become common place. The advent of crypto currencies and the advancement of block chain technology also defined the period.

Banking 5.0
A vision for the next generation of banking known as Banking 5.0 places a strong emphasis on sustainability, ethical technology use, and human-machine collaboration. It sees an integrated plan that makes use of automation, data, and technology to produce more personalised and sympathetic banking experiences. Banks are expected to work with customers to integrate banking services with sustainability and wider well-being objectives in this day and age.

Industry 5.0 and Banking 5.0
Both Industry 5.0 and Banking 5.0 envision a future in which cutting-edge technology is used to build more sustainable, customer-centric, and human-centred environments.

TO EXPLORE THE POSSIBILITIES OF IMPLEMENTING INDUSTRY 5.0 IN BANKING SECTOR: Through this objective we have tried to find out what possibilities are there to adopt the Banking 5.0. Before it we have presented the relationship between Industry 5.0 and Banking 5.0:

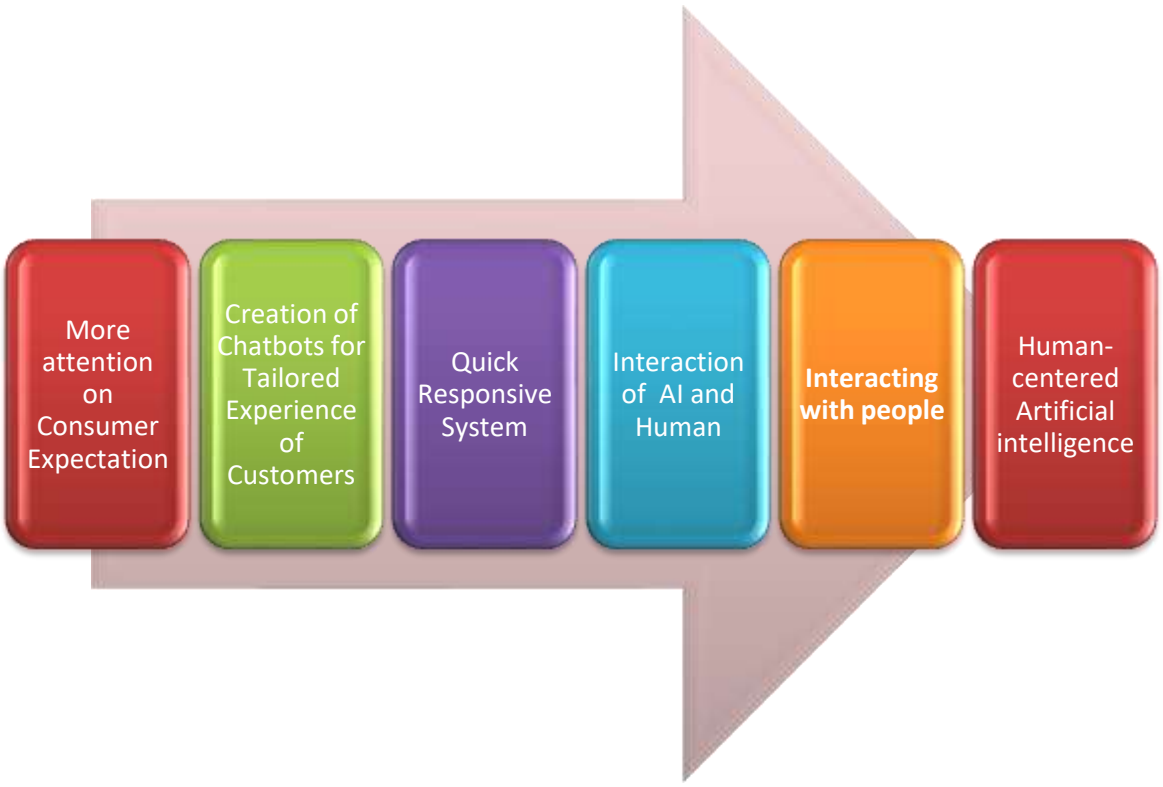
Relationship between Industry 5.0 and Banking 5.0

Category	Industry 5.0	Banking 5.0
Human-Machine Collaboration	advanced robotics and automation systems work alongside human workers in manufacturing	AI-driven financial advisors and customer service bots collaborating with human bank employees to provide better services.
Sustainability	It encourages sustainable manufacturing practices	It promotes sustainability by considering environmental and social factors in investment and lending decisions
Personalization	It is about mass customization of products	It is about offering personalized financial advice and services based on individual customer needs and preferences.
Ethical Technology Use	It relates to ethical AI and responsible automation	It pertains to responsible data handling and AI use in financial services.
Data Utilization	Data analytics and IoT (Internet of Things) are used to optimize manufacturing processes	Data is harnessed to create more personalized and efficient financial services.
Customer-Centric Approach	It's about producing goods that precisely meet customer demands.	It is about providing financial services that align with individual customer goals and preferences.
Sustainable Growth	It means sustainable and efficient manufacturing practices that reduce waste and environmental impact.	It involves responsible lending and investment decisions that consider long-term environmental and social impacts.

Source: Author's own contribution

For implementation of successful practices of Banking 5.0, a proposed model is suggested:

Fig.2:



A Standard Model for Banking 5.0

As suggested in the above model Banking 5.0 will have following elements:

- **More attention on Consumer Expectation:** the banking industry should focus on consumer's expectation and avoid that services which are vague for consumers.
- **Creation of Chatbots for Tailored Experience of Customers:** By using client information from previous transactions, conversation history, and comments, an AI chatbot can produce personalized responses. The AI chatbot can utilize this data to compile a special profile for each user, which it can then use to deliver responses that are tailored to each user's individual requirements and interests.
- **Quick Responsive System:** A strategic program for Banking 5.0 for having the goal of reaching every customer leading and enhancing customer responsiveness. Quick Response has specialized banking services and information-exchange features that help it reduce lead times.
- **Interaction of AI and Human:** banks can integrate AI with human for communicating with people in variety of ways. For this they can increase human potential by better training. It may also foster greater inventiveness.
- **Interacting with people:** By human-machine collaboration, banks may engage with both employees and customers in fresh, more efficient ways.
- **Human-Cantered Artificial Intelligence (HCAI):** An emerging field called HCAI aims to develop AI systems that enhance and supplement human capabilities rather than replacing them.

Innovative practices in Banking 5.0: The most recent version of banking, version 5.0, focuses on combining operational and information technology in financial services with near-real-time connectivity to provide meaningful information to decision-makers. While relying heavily on automation, Banking 4.0 has scared people on factory floors. In a futuristic setting, Banking 5.0—which will bring empowered humans back to the factory floor—is what Frost & Sullivan sees as the next big thing.

- **Biometric Authentication:** Enhancing security and streamlining the login process are benefits of using biometric authentication techniques like fingerprint, facial recognition, or even behavioural biometrics.
- **AI-Driven Chatbots and Virtual Assistants:** Artificial intelligence (AI)-driven intelligent chatbots improve the effectiveness of customer care by providing real-time customer help, assisting with transactions, making product recommendations, and even giving financial advice.
- **Predictive Analytics:** With the aid of predictive analytics, banks may examine consumer data to forecast demands, identify spending trends, and provide real-time personalized product recommendations and financial advice.
- **Blockchain and Smart Contracts:** utilizing blockchain technology for quick, safe transactions. Smart contracts automate procedures, eliminating the need for middlemen and cutting down on transaction fees.
- **APIs for Open Banking:** To stimulate collaboration and innovation within the sector, financial institutions are embracing open banking by offering APIs that enable outside developers to produce cutting-edge financial products and services.
- **Digital Wallets and Contactless Payments:** The use of physical cards and cash is decreased by the use of digital wallets, contactless payment mechanisms, and QR codes that use Near Field Communication (NFC) technology.
- **Robo-Advisors:** Algorithms and AI are used by robo-advisors to automate investing strategies and offer customers cost-effective, individualized investment advice based on their financial objectives and risk tolerance.
- **Peer-to-Peer (P2P) Lending and Crowdfunding:** P2P lending services link lenders and borrowers directly, facilitating faster loan approvals and possibly reduced interest rates. Through the use of crowdfunding platforms, companies and individuals can solicit money online from a huge number of people for their projects or causes.
- **Augmented Reality (AR) and Virtual Reality (VR) Experiences:** By offering virtual branch tours, immersive banking experiences, and interactive financial data visualization, AR and VR technologies improve customer engagement.
- **Cryptocurrency and Central Bank Digital Currencies (CBDCs):** Investigating the potential of cryptocurrencies and CBDCs as investment and payment methods that enable speedier international trade and reduce dependency on conventional financial institutions.

CONCLUSION

Financial firms have made a deliberate effort to radically alter the banking landscape, as evidenced by the wide variety of new practices in Banking 5.0. The advancements in Banking 5.0 provide a comprehensive strategy for developing a financial ecosystem that is more inclusive, effective, and sustainable. The banking sector is prepared to handle the demands of a fast-changing global economy by putting the interests of the client first, utilizing cutting-edge technology, maintaining regulatory compliance, and encouraging environmental responsibility. In addition to enhancing banking services, these developments provide a substantial

contribution to broader socioeconomic objectives, promoting financial empowerment and stability for people around the world.

SUGGESTIONS

Through the overall observation we can suggest the following:

- **Educating Customers**
- **Encouraging cointegration**
- **Strong mechanism for Cybersecurity**
- **Encourage Green Banking**
- **Feedback and consultation from customers**
- **Innovative technology's monitoring should be done regularly.**

Challenges in adoption of Banking 5.0: In the shift to Banking 5.0, financial institutions face diverse challenges:

- Ensuring robust cybersecurity against evolving threats, especially with biometric authentication and blockchain, demands significant investment.
- Navigating complex regulations while integrating new technologies requires constant adaptation.
- Overcoming customer resistance entails educating clients about innovation benefits, fostering trust.
- Addressing the digital divide is vital for equal technology access. Achieving interoperability and balancing data privacy amid innovations are technical hurdles.
- A shortage of skilled professionals, competition from fintech startups, legacy system constraints, and sustainability concerns add complexity. Success mandates careful planning and collaboration.

Is India ready for Adoption of Banking 5.0?

The current status of technology in India is in crucial stage. For making India fully verse with Banking 5.0, India needs to update all its mechanism of technology in every corner and accessible to all.

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