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IMPACT OF INDUSTRY 4.0 IN THE BANKING INDUSTRY: A COMPREHENSIVE ANALYSIS

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ABSTRACT

Industrial revolution has created a great impact across sectors, this paper focuses on the impact of I 4.0 in banking sector. Here we have discussed how it as transformed banking operations and service by enhancing customer engagement, workforce management, process optimisation etc. Impact of technologies like Artificial intelligence, Machine learning, Internet of things, Big data, Blockchain, Robotics, Augmented reality, Virtual reality, Cloud computing.in Banking sector is discussed. Challenges in implement these technologies are also listed.

Keywords: Banking, Industry revolution 4.0, technology, digital future, Optimisation

1. INTRODUCTION

There is fourth industrial revolution that is happening worldwide which is called as industry 4.0 (l4.0). ln addition, technology like internet of thing, smart robotics, cloud computing, data science/ artificial intelligence has changed how people work around the globe especially in banks where these advanced Accordingly, this will look into the effect that IT4.0 has on banking, studying the particular impact of every technology then ending with a general discussion concerning the future of banking within IT4.0 era. (Mhlanga,2020)

Impact of Industry 4.0 in the Banking Industry:

The advent of Industry 4.0 led banking into era of new banking system in which artificial intelligence , blockchain and the internet of thing are integrated. The banks are using AI to automate redundant functions, improve communication between humans and machines, and detect patterns indicative of cyber-theft. Machine learning will help to analyze large sets of information, searching for unusual changes in transactions and suspicious activities of specific accounts or gadgets. (Vasylieva, et al, 2019)

The decentralization and secure nature of blockchain technology make if well suited for adoption for applications in payments, trade finance and identity manage as well as for implementation in blockchain based payment systems which are capable of providing fast, cheap and secure cross border transactions and for development of blockchain enabled trade finance (Colak, et al, 2021)

Through the Internet of things (IoT) which is a highly distributed systems involving interconnected devices emanating from sensors, an immense volume of information is being generated from the IoT that could help enhance banking operations as well as customer experience. IoT devices are collecting information from ATMs, sensors (Iqbal et al, 2019)

Industry 4.0: Transforming Banking Operations and Services

The banking sector is experiencing radical shifts in terms of technological advancements that are influenced by I4.0. The use of these, the artillifical intelligence, the blockchain, the IoT, and the RPA is transforming banks customers relation, employees management and processes optimization. (Squlbar et al, 2020)

Customer Interaction: Digital channels and personalized experiences.

Customer interface in the bank is undergoing a revolution thanks to I4.0 technologies. Customer support is provided 24/7 by chatbots using AI powered and virtual assistants who answer questions, solve problems, give custom suggestions and many more. Customers can always count on these digital assistants as they provide round-the-clock customer support to their clients. (Panchal et al , 2021)

I4.0 technologies are supporting customer-driven mobile banking apps that enable customers to manage their finances at any time and from wherever they may be. Customers can use these apps to make transfers, pay bills, manage their accounts as well as have an easy way of obtaining financial data from their phones or tablets. The convenience is increasing customer happiness as well as loyalty. (Ozturkoglu, et al 2021) Openings of new accounts and applications for credit have become simpler as a result of the automated processes driven by artificial intelligence and data analytics. Digital processes eliminate paperwork, speed up transaction times and provide the customer with a smooth shopping experience. (Weber et al, 2019)

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Workforce Management: Adapting to the Digital Era

I4.0 technologies are also making significant impacts in how banks manage their workers. Through automation of these routine tasks will ensure that there is enough time for the highly skilled workers to concentrate on more complex functions. Employee productivity and job satisfaction are going up, operational costs cutting down with this turnover.

As a result, the upskilling of workers and reskilling initiatives become more critical in banks that want to meet the new trends of I4.0 age. Banks are spending on training programs to help their people learn how to utilize and manage the introduced technologies. This makes the workforce flexible enough to support digital development path for the bank. (Shah, et al 2021) I4.0 technology allows workers additional flexibility which is provided through remote works arrangement. Remote work options are being adopted by banks for instance where their staff can work from home or any other location. It improves work-life balance and increases competition for jobs, thereby increasing employee engagement and productivity. (David, et al, 2019)

Process Optimization: Enhancing Efficiency and Reducing Costs

Such is how i4.0 technologies are streamlining operations in the sector with a view to enhancing productivity while lowering expenses Repetitive and rule-based activities like opening of account, processing loans and customer service queries are being automated with RPA. Such automation is releasing human staffs for higher quality works and increasing processing operations effectiveness". (Lima et al, 2020)

Decision making by artificial intelligence is improving risk management as well as fraud detection. AI models are capable of analyzing large amounts of data to reveal trends and outliers, therefore banks are able to base their lending policy on reasonable grounds like fraud detection and customer grouping. The data driven strategy minimizes the risk and securing customers' money. (Bilan et al, 2019)

Banks are getting a real time view of their operations through real-time data analytics that enable them to spot an issue as it occurs and take immediate corrective action. Banks can monitor transaction patterns and fraud detection as wells optimum use of their resources for efficient operations. (Da Xu et al, 2020).

Embracing the Digital Future

I4.0 technology is redefining banking transforming it to a world characterized by innovation, efficiency and customer centricity. The banks that adopt digital transformation and use I4.0 correctly, have a bright future ahead of them. Banks should improve interaction with Customers, ensure efficient use of the workforce, and simplify processes in order to create advantage over others and add more value to their respective clients. (Dean et al, 2020).

2. LITERATURE REVIEW

Industry 4.0: Revolutionizing the Banking Landscape

I4.0 has far-reaching effects on banking business. Technologies under I4.0 like artificial intelligence, blockchain, IoT, and big data analytics are changing how banks do business, engage customers, and manage staff. (Omarini et al, 2022)

AI: Improvement of automation, customer service, and risk reduction.

Therefore, AI remains the most prominent element of I4.0 in the banking sphere. Bankers are now relegated in the background as AI-powered systems now automate routine tasks leaving them with more value-added activities. Automation of these processes is resulting in remarkable gains in terms of efficiency, output and cost-cutting. (Huy, et al, 2021) Secondly, AI has improved customer service by providing round-the-clock support, addressing queries, solving problems and making custom suggestions. AI chatbots and virtual assistants can handle routine requests from customers and AI can help to get data about customers' wants and needs. (Gupta et al, 2023) Moreover, AI is key for fraud detection as well as managing risks. Through analysis of transaction behaviour, account activity and device usage trend, AI models have the ability to detect signs of fraudulent transactions that might result in financial losses. By adopting this approach, banks will be able to detect early on any fraudulent activities being perpetrated on their clients' businesses thereby protecting assets of other people as well. (Mekinjic, et al, 2019)

Blockchain: Payment revolution, trade finance revolution, and identity management.

The foundational software of crypto trading known as blockchain tech will change how banks operate completely. The blockchain is distributed and hence secure making it appropriate for payment systems, trade finance, and identification management application. (Adams et al, 2020) Payment systems based on blockchain ensure faster, cheaper and safer international payments transactions. Blockchain also eliminates intermediaries like banks and correspondent banks who might lead to delays by increasing costs. Moreover, Blockchain has some built-in features that do not allow easy replication or reversing of transactions. (Khadka et al, 2020) Trade finance is also being changed through the adoption of the blockchain, which provides a safe and open platform for transaction processing. Contracts that are smart or self-executing built into the block can automate the trade processes by cutting down on the paperwork, mistakes and fraud.

(Gupta et al, 2023) In addition, blockchain is leveraged in developing identity management solutions of today. This could give people more control over their personal information, facilitate verifiable identity, and enhance trust. This may also decrease chances of identity theft and fraud while facilitating ease in provision of financial services to under-serviced or un-serviced populaces.(Agarwal et al, 2023)

IoT: Utilizing Data for Operational Effectiveness, Risk Management, and Personalized Client Experiences

As the IoT emerges as a huge network comprising of connected devices embedded with sensors it is generating lots of useful data that can be utilized to enhance banking processes and customers' experience. Data is collected using various Internet of Things (IoT) devices from ATMs, sensors, and other interconnected devices. The company's analysis processes this information to detect any anomalies, enhancing resource maximization and performance effectiveness. (Assaf et al, 2023) For example, intelligent sensors can check water pipes for possible leaks and prevent damaging events. Furthermore, IoT data helps in optimizing customer services as they offer information on customers' behaviors and desires. As an illustration, banks may leverage IoT information to tailor ATM interchanges and supply clients pertinent fiscal counsel. (Abraine et al, 2020)

Big Data Analytics: Customer Insight, Risk Management, and Price Optimization

Bankers are looking at extensive information on payments, social networks as well as other places. Big data is used in understanding customers' dynamics while developing new products and coming up with new targeted marketing strategies. (Smys et al, 2021) The banks are gaining more insights regarding their customers' behavioural patterns thanks to big data analytics. Such information helps in creating individual products and services, enhancing customer care provisions, as well as tweaking marketing activities. Big data analytics is also helping in better risk management by enhancing risk identification and assessment. Banks are able to look at huge volumes of data to spot what seems like risky activity and take preventive measures beforehand. (Birau et al, 2020)

In addition, big data analysis helps banks find a way of improving pricing on goods and services as well. Analyzing customer data and market trend helps banks develop right price for various customer segment and products. (Vanani et al, 2020)

Embracing the Digital Transformation

The application of 4.0 technology in banking is changing the sector, opening up space for novelty, improved results, and customer focus. Digital banking is a phenomenon of the future and those banks that invest in it and learn how to use I4.0 technologies will out survive others in that time. Improving customer interactions, optimizing workforce management, efficient process execution and insightful data analytics help banks to improve their competitiveness and add value to clients' businesses. (Popp, et al, 2020)

Industry 4.0 Technologies

S. No.	Industry 4.0 technology	Explanation	
1	Artificial intelligence (AI)	Artificial Intelligence (AI) refers to technological tools such as automated robots with human like intelligence capabilities in terms of carrying out actions such as processing tasks, crunching information, as well as prediction making.	(Lu et al, 2021) (Wang et al, 2019)
2	Machine learning (ML)	ML is a part of AI which enables computers to learn autonomously so that they can detect trends in information, predict outcomes, and enhance decision making.	(Carleo et al, 2019) (Bi et al, 2019)
3	Internet of Things (IoT)	It is a network of physical devices, vehicles, home appliances, and other such connected devices that is composed of electronics, software, sensors, actuators, and connectivity thereby permitting these items to interface and share data.	(Nord et al, 2019) (Kopetz, et al, 2022)
4	Big data	Big Data is a huge amount of information that can only processed by modern means applied. Big Data allows understanding customers' habits, finding trends in information, making more reasonable decisions.	(Ngiam et al, 2019) (Hariri et al, 2019)
5	Blockchain	Blockchain technology is based on a distributed ledger and it	(Guo et al, 2022)

		can be employed in tracking of goods and services, management of digital identities, and elimination of fraud.	(Shrestha, et al, 2020)
6	Robotics	Robotics is the technological branch concerned with the development and application of robotics, including designing, building, programming and running robots for automating tasks or implementing in hazardously exhausting environments where workers are needed to become productive.	(Nelson et al, 2021) (Murphy et al, 2019)
7	3D printing	The modern day's 3D printing makes it easy to print the prototypes as well as production models; in addition, they are the best option when making customized spare parts.	(Hag et al, 2022) (Ramlan et al, 2019)
8	Augmented reality (AR)	AR is a technology that superimposes digital data on the actual environment and AR may be used for giving instructions, providing useful information, as well as entertainment.	(Alalwan et al, 2022) (Wei , 2019)
9	Virtual reality (VR)	VR is a technological innovation whereby it allows you to experience a virtual reality in which one can train, educate or entertainment.	(Jiang et al, 2021) (Simons et al, 2020)
10	Cloud computing	Cloud computing refers to a delivery model where one is able to deliver computing solutions such as servers, storage, databases, networking, software, analytics, and intelligence through the internet.	(Ahmed et al, 2021) (Bilal et al, 2021)
11	Nanotechnology	Nanotechnology involves manipulating matter at the atomic and molecular level, allowing for the creation of new materials, advancements in product performance, and advancements in medical treatments.	(Sajadi et al, 2019) (Verma et al, 2021)

Some specific examples of how each technology can be used in each banking operation:

- **Customer onboarding:** AI can be used to automate the onboarding process, such as verifying customer identity and storing important documents and customer records can be made secure and indestructible using blockchain, while cloud computing implementing Changing requirements that can be met scale the onboarding process. (Bandara et al, 2019)
- **Customer service:** AI-powered chatbots and virtual assistants can provide 24/7 customer support and AR and VR can be used to provide personalized and immersive customer experiences. (Ellitan et al, 2019)
- **Fraud Detection and Prevention:** AI and ML algorithms can be used to identify patterns of fraudulent activities and large amounts of data can be analyzed with big data to identify suspicious transactions while using blockchain, cases can be developed all non-destructive records . (Ashfaq et al, 2023)
- **Risk management:** AI and ML algorithms can be used to assess and manage risk and big data can be used to identify and quantify risk while stress testing can be used to simulate how a bank will perform under different circumstances in. (Hanh et al, 2021)
- **Compliance:** AI and ML algorithms can be used to monitor violations and RegTech solutions can also be used to automate compliance tasks. (Abriane et al, 2020)
- **Manufacturing:** AI and ML algorithms can be used to analyze customer data and identify unmet needs and use big data to understand customer behavior and preferences and use customer insights to develop products and services a it meets the needs of customers. (Abriane et al, 2020)
- **Marketing and sales:** AI and ML algorithms can be used to target customers with tailored marketing messages and Big data can be used to segment customers and identify sales opportunities and CRM system can be used to manage customer relationships and track sales performance.(Pandey et al, 2021)

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- **Operations and supply chain management:** AI and ML algorithms can be used to optimize operations and supply chains and IoT can be used to collect data from devices and sensors to monitor and improve efficiency and can using Cloud computing to scale operations and supply chains Meet changing demands. Robots can be used for passive tasks. (Kazemi et al, 2021)
- **HR management:** AI and ML algorithms can be used to automate HR tasks, such as resume screening and interview scheduling and Big Data can be used to identify and develop employees while talent management systems can be used to execute following employee performance and development.(Pontes et al, 2022)
- **Finance and Accounting:** AI and ML algorithms can be used to automate finance and accounting tasks, such as reconciling accounts and generating reports and analyzing big data to identify and enable trends automate common tasks with RPA.(Birol et al, 2019)

3. ANALYSIS

1. Digital transformation of customer experience: Industry 4.0 has changed the way customers engage with banking services and digital channels, mobile applications and personalized interfaces have redefined the customer experience. Chatbots powered by artificial intelligence (AI) streamline customer support, better resolve queries and, predictive analytics and machine learning algorithms provide personalized product recommendations and investment advice, tailor services to individual needs (Singh et al, 2022)
2. Automation in back-office operations: Automation, a component of Industry 4.0, has had a significant impact on back-office operations in banking with robotic process automation (RPA) for routine tasks such as data entry, . paperwork, compliance checks and this is not only Reduces administrative costs but also reduces errors, increases efficiency and speed. (Boute et al, 2022)
3. Enhanced risk management and fraud detection: The integration of Industry 4.0 technologies has enhanced risk management in the banking industry and provides advanced data analytics, powered by AI and machine learning banks are able to analyze huge amounts of data in real time, identify risks and potential risks and risks and potential risks better detect fraudulent activities Security Strengthens and protects customer assets. (Galeone et al, 2019)
4. Personalized Financial Services: In the midst of Industry 4.0, the financial services industry has undergone a transformation with the emergence of personalized services. By harnessing the power of big data analytics and AI, banks are now able to cater to each customer's unique needs with customized financial products and services. From personalized loan offerings to tailor-made investment portfolios, these specialized services not only increase customer satisfaction and loyalty, but also enable banks to stay ahead in the competitive market (Jaiwant et al, 2022)
5. Internet of Things (IoT) in the banking industry: The Internet of Things (IoT) has found its way into the banking industry, transforming processes and customer interactions with IoT-enabled devices enabling seamless transactions , smart ATMs, real-time monitoring of banking activities and filling machines and associated Permission for Knowledge Solutions sensors, thereby changing the way consumers access and manage their finances (Hermawan et al, 2023)
6. Blockchain Technology: Streamlining processes through secure transactions: Blockchain technology has emerged as a disruptive force in the banking sector and as decentralized and secure nature ensures transparent and tamper-proof transaction records with external cryptocurrencies, blockchain is being used for smart contracts, trade finance and identity verification, reduce implementation time and operational complexity. (Sarfraz et al, 2021)

Impact of Industry 4.0 Technologies in Banking operations

Industry 4.0 Technology	Impact on Banking Operations	
Artificial Intelligence (AI)	• Enhances customer service with chatbots and virtual assistants, providing 24/7 support. Enables personalized investment recommendations and predictive analytics for risk assessment and fraud detection. • Streamlines back office operations through automation, improving efficiency in applications such as data analysis, customer segmentation and compliance checks.	(Chutani et al, 2019) (Kavya et al, 2019)

Internet of Things (IoT)	• Improves customer experience with ATM-related smart devices, facilitates seamless transactions and real-time monitoring of banking activities. • Enables wearable integration for new payment solutions and remote banking services. Increases operational efficiency by managing and maintaining banking instruments for maintenance and security purposes.	(Gangadharan et al, 2016) (Khan et al, 2020)
Blockchain	• Protects transactions through a transparent, decentralized ledger system, reducing fraud and ensuring the integrity of financial records. • Empowers efficient and secure cross-border transactions and trade finance by eliminating intermediaries and reducing processing times. • Facilitates smart contracting, automates contracting and reduces administrative costs.	(Sims et al, 2021) (Guo et al, 2016)
Robotic Process Automation (RPA)	• Automates repetitive tasks in back office operations, such as data entry, document processing, and monitoring compliance, reducing operational costs and human error. • Increases efficiency by accelerating productivity, empowering people for high-value tasks that require decision-making and creativity.	(Patri et al, 2021) (Khan et al, 2021)
Big Data Analytics	• Enables banks to analyze vast amounts of customer data, gaining valuable insights for their own businesses, risk assessment and fraud detection. • Improves decision-making processes by providing actionable intelligence into customer behavior and market dynamics and forecasting development. • Enhances targeted marketing strategies	(Hung et al, 2020) (Srivastava et al, 2015)
Cybersecurity Solutions	• Protects sensitive financial data and customer information from cyber threats, ensuring the security and integrity of online banking transactions. • Implements robust encryption techniques and firewalls to prevent unauthorized access and data breaches, safeguarding customer assets and trust.	(Kuzub et al, 2022) (Panja et al, 2013)
Biometric Authentication	• Strengthens security measures by using unique biological characteristics for identity verification, reducing the risks associated with password-based authentication. Enhances user experience by offering convenient and secure access to banking services through fingerprint, facial, or iris recognition technologies.	(Amaral et al, 2021) (Bah et al, 2021)
Quantum Computing	• Potentially revolutionizes encryption methods, providing banks with unprecedented levels of security against cyber threats. • Enhances data analysis capabilities, enabling faster and more complex computations for risk modeling, fraud detection, and optimizing investment strategies. • Has the potential to transform computational power and data processing in banking operations.	(Orus et al, 2019) (Marecek et al, 2020)

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5G Connectivity	• Improves network speed and reliability, enabling faster and more efficient banking transactions and data transfers. • Facilitates real-time communication between banking systems and connected devices, enhancing IoT applications and remote banking services. • Supports high-bandwidth applications and services for seamless customer experiences.	(Ris et al, 2021) (Barman et al, 2022)
Augmented Reality (AR) and Virtual Reality (VR)	• Enhances customer engagement and education by providing immersive experiences in banking services, such as property tours for mortgage applications or virtual financial planning sessions. • Enables training simulations for bank employees, improving learning experiences and performance in complex tasks. • Has the potential to revolutionize customer service and training programs.	(Ooi et al, 2023) (Baraas et al, 2021)

Application of Industry 4.0 technologies in Banking operations

Banking operation	Technology
Customer onboarding	Artificial intelligence (AI), blockchain, cloud computing
Customer service	AI, chatbots, virtual assistants, augmented reality (AR), virtual reality (VR)
Fraud detection and prevention	AI, machine learning (ML), big data, blockchain
Risk management	AI, ML, big data, stress testing
Compliance	AI, ML, regulatory technology (RegTech)
Product development	AI, ML, big data, customer insights
Marketing and sales	AI, ML, big data, customer relationship management (CRM)
Operations and supply chain management	AI, ML, IoT, cloud computing, robotics
Human resources	AI, ML, big data, talent management systems

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management	
Finance and accounting	AI, ML, big data, robotic process automation (RPA)

Challenges of Adopting Industry 4.0 in the Banking Sector

The fourth technological revolution, also known as Industry 4.0, is characterized by the convergence of digital, physical and biotechnology and this revolution is significantly impacting all sectors of society, including the banking industry Industry 4.0 Technology allow banks to allow for automation, Improve efficiency, enhance customer experience, enable new products and services, but the adoption of Industry 4.0 technologies is a complex and complex process and at that in this section we will explore some of the challenges that banks face in adopting Industry 4.0 technologies.

Legacy Infrastructure and Systems property planning and planning (Masood et al, 2020)

The biggest challenge that banks face in adopting Industry 4.0 technologies is their legacy infrastructure and systems as many banks still use IT systems developed even before the Internet and these legacy infrastructures are often expensive and can be expensive to maintain it Banks may need to make significant investments to upgrade their IT infrastructure before fully adopting Industry 4.0 technologies. (Prause et al, 2019)

Cybersecurity Concerns

Industry 4.0 technologies may also pose new cybersecurity risks. Banks are already a prime target for cyber attacks, and the use of Industry 4.0 technologies can make them more vulnerable and as banks connect more devices and systems to the internet, they provide more opportunities for hackers get their sensitive data, banks The need is to take steps to protect your data and systems from cyberattacks, such as implementing strong cybersecurity policies and your' employees educating your employees about cybersecurity risks (Huy et al, 2021)

Data privacy and compliance

Industry 4.0 technologies also generate large amounts of data, which can raise concerns about data privacy and compliance and banks need to ensure they collect, store and use customer data responsibly and legally as well as data privacy awareness applicable regulations, such as the EU General Data Protection Regulation (GDPR). (Tay et al, 2021)

Upgrading employee skills and competencies

Adopting Industry 4.0 technologies also requires professionals with the knowledge and skills to successfully execute these new systems and many bankers lack the necessary skills to use Industry 4.0 technologies, such as data analytics, artificial intelligence and cybersecurity Employees must be equipped with the necessary skills. (Escobar et al, 2020)

Resistance to cultural change

The adoption of Industry 4.0 technologies often requires significant changes in organizational culture and processes and this can be met with resistance from employees who are comfortable with the way things have always been done there is a look at the need for banks to promote a culture of innovation and change management and adapt to change. (Buchi et al, 2021)

Debt and investment considerations

Implementing Industry 4.0 technologies can be a significant investment. Banks need to consider hardware, software, training and consulting costs and invest the time and resources required to implement and integrate this technology into their existing systems.(Mhlanga, 2020)

Challenges of communication and integration

Industry 4.0 technologies come from many different vendors and operate on different platforms and protocols and ensure collaboration and seamless integration between these technologies can be complex and require expertise in system integration and data management. (Usta et al, 2019)

Lack of clear direction and direction

Successful adoption of Industry 4.0 requires a clear strategy and roadmap that is aligned with the bank's overall business goals and objectives and without a clear strategy, banks may find themselves using technology without purpose or clear instructions are being used. (Raj et al, 2020)

Measuring impact and ROI

Determining the impact of Industry 4.0 technologies and quantifying their return on investment (ROI) can be challenging and because many benefits are intangible and long-term, banks need to make benchmarks and a framework for evaluating the impact of this technology and demonstrating its value to stakeholders . (Duman et al, 2021)

Ethical considerations and algorithmic biases

The use of AI and machine learning in Industry 4.0 applications raises ethical concerns about algorithmic bias and discrimination and banks must ensure that their algorithms are transparent, fair, and in line with ethical principles consistent with appropriate lending practices.(Cowls et al, 2021)

Adopting Industry 4.0 technologies is a complex and complex process and banks must carefully consider the challenges associated with the adoption of this technology and develop a comprehensive adoption plan for this technology It will be well positioned to make it well in a rapidly growing economy. (Nosella et al, 2020)

4. CONCLUSION

The discussion made in the above areas evidently indicate that Industry revolution 4.0 had indeed caused an impactful revolution in the banking sector. These technologies led to a new era in banking system. Artificial intelligence's chat bot, Virtual reality, Augmented reality can enhance customer support, blockchain technology can increase the security of payment systems, Internet of Things can be used for risk management & personalised client experience, Big data analytics can be used for gaining customer insights & price optimisation, Robotic optimisation for automation and so on to improvise experience of overall banking sector and streamlining the process. However, we have also identified challenges like cyber security concerns, data privacy issues, impact on return on investment and ethical considerations for the implementation of technologies in banking sector.

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