Application of AI in Banks and Future Development Strategies

Zhiyi Wang

Zhengzhou No. 7 Middle School, Zhengzhou, China
Email: 19337357777@163.com (Z.Y.W.)
Manuscript received September 9, 2024; revised October 7, 2024; accepted November 16, 2024; published November 27, 2024.

***Abstract*—With the rapid development of artificial intelligence, it has brought huge productivity gains and changes to all industries, which makes far-reaching impact of artificial intelligence on various industries and the future development trend is an important research issue. This paper focuses on the banking industry and explores the current status of AI application in the banking industry as well as the future development prospects, respectively, from the technical point of view, policy factors, data issues, etc., based on the actual statistical data for a comprehensive analysis. The report shows that AI in the banking industry has great potential to promote the digital-intelligent transformation of the banking industry, while there are several challenges, such as data privacy, legal ethics, unemployment and other risks worth noticing. In order to regulate the healthy development of AI in the banking industry, this report puts forward corresponding measures and recommendations, which provides a reference guide for the banking industry and a decision-making basis for policy departments, and has significant application value.**

***Keywords*—Artificial Intelligence (AI), banking industry, digital-intelligent transformation**

I. Introduction

The world has entered the era of digital economy, with the rapid development of big data, cloud computing, artificial intelligence and other emerging technologies, especially the development of artificial intelligence, with the emergence of AlphaGo, ChatGPT, artificial intelligence is increasingly integrated into our lives, and in recent years has penetrated into all walks of life in our country, which has fostered the emergence of new changes in the industry and boosted productivity by a huge margin, including the Commercial Banks (Chwila, 2023). This essay focuses on the various areas in which AI can be applied in commercial banks, such as risk management, anti-fraud operations, and customer service, and analyses its advantages and limitations. The article summarises the opportunities and challenges faced by commercial banks in applying AI, and how to achieve better business benefits and customer satisfaction with the safe and effective use of AI (Li, 2021). The article introduces the basic concepts and principles of AI technology, and then discusses that in commercial banks, AI technology can be applied to a variety of areas, such as data analysis, customer service, credit assessment, and anti-fraud operations, etc. The article also discusses the impact of AI technology on commercial banks, including aspects such as improving work efficiency, reducing costs, and innovating business models (AI-Tahat and Moneim, 2020). This essay examines the impact of the application of artificial intelligence technology in Jordanian commercial banks on cybersecurity governance. The article describes the role played by artificial intelligence in cybersecurity governance. The role of the application of Artificial Intelligence technology on cybersecurity governance in Jordanian commercial banks and analyses the opportunities and threats of Artificial Intelligence technology for cybersecurity governance in Jordanian commercial banks.

The influence of artificial intelligence on commercial banks is reflected in all aspects, which has a huge impact on operation and management, but also promotes the digital transformation of traditional commercial banks, breaks the constraints of the traditional business model, and fosters the competitive advantage of the new era (Ajayi *et al.*, 2023). The paper explored the application of AI technology in the internal audit work of commercial banks in Nigeria through a research study on the country, including the aspects of improving the utilisation of AI technology, improving the knowledge and ability of internal auditors to use AI technology, and improving the internal audit work process of the bank, among others. In the next few years, this technology will further solve the time and space constraints for financial institutions, promoting them to operate more smoothly and efficiently in their business processes, operation modes, risk control, etc., and achieving quality improvement and cost reduction for the financial industry. Therefore, it is of great theoretical and practical significance to study the application, impact and influence of AI technology on commercial banks and the corresponding countermeasures.

In addition, the number of users of mobile banking increased significantly in the aftermath of the outbreak. According to the survey, it is expected that some users' habits will be changed after the outbreak subsides, with 15 to 45 percent of consumers reducing their visits to physical branches. AI is therefore a self-service with future potential to improve the speed and accuracy of decision-making with proper risk control. Its value creation potential across industries is unrivalled, with estimates suggesting that AI technology could bring $1 trillion in incremental value to the global banking industry annually. At the same time, user expectations of banking services are rising, with a critical need for the ability to provide personal and tailored services based on potential customer needs, fraud detection and prevention, limiting accidental spending and the ability to conduct business without leaving home. However, in the current period of big data transformation, the application of AI is still immature and needs to be further improved, and to meet these requirements, the banking industry needs to invest and transform its AI system capabilities to develop innovations to meet the changing needs of customers. This report is about the application of AI to commercial banks from the main detailed discussion of the following issues: (1) Current application of AI in banks; (2) Defects of AI in banking application; (3) How can AI develop better in future banking applications?

The rest of this paper is organized as follows: Section II will introduce the relevant background and literature review, Section III will use the actual data for statistical analysis,

focusing on describing and discussing the application of AI in the banking industry and the future development strategies, and conclusions will be drawn in the last section.

II. What Is Artificial Intelligence

Artificial Intelligence (AI) is a concept put forward in 1956, Dartmouth Conference, there is no uniform consensus on the concept of AI, overall artificial intelligence refers to the intelligence shown by human-made systems. According to this definition, AI includes a very wide range of contents, from the simplest computer programme to robots with complex emotions and comprehension abilities like human beings can be considered as AI.

Artificial Intelligence has a wide range of research and application areas, including computer science, psychology, philosophy, neuroscience, cognitive science, ergonomics, cybernetics, logic and many other fields. Meanwhile, according to the level of ability, artificial intelligence is mainly divided into Narrow Artificial Intelligence (ANI), general artificial intelligence and super artificial intelligence.

(1) Narrow Artificial Intelligence (ANI) is AI that does not produce real reasoning and problem solving skills.

(2) General Artificial Intelligence (AGI) is AI that is comparable to humans in all aspects. General AI, which we cannot do yet, is a broad mental ability to think, plan, and solve problems.

(3) Super Artificial Intelligence (ASI) is an AI that surpasses human intelligence and can perform any task better than a human.

Artificial Intelligence has experienced three ups and two downs since its birth, as shown in Fig. 1.

(1) First prospect period: In 1943–1969, American psychologist Frank Rosenblatt proposed the first neuron model that could automatically learn weights. The first period decline: in 1969–1982, American scientists Marvin Minsky and others pointed out the main defects of linear models such as perceptrons in the book Perceptrons, which directly led to the research related to neural networks to enter a trough period.

(2) Second boom: 1982–1995, with the introduction of John Hopfild's loop-connected Hopfield network, driving the tide of AI development. Second Decline: Research on neural networks gradually entered a trough with the rise of traditional machine learning algorithms represented by Support Vector Machines (SVMs).

(3) Third boom: In 2006, Geoffrey Hinton and others found that multi-layer neural networks can be better trained by training layer by layer and achieved better error rates than SVM on the MNIST handwritten digit picture data set.

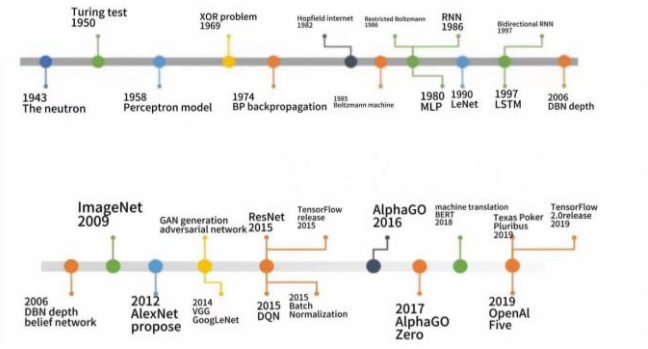

Fig. 1. The evolution of artificial intelligence (from Google).

III. Basic Knowledge about AI

A. Three Elements of Artificial Intelligence Development

If The three elements that are indispensable to the operation of AI make it an important foundation for AI to have development potential.

(1) Algorithm: this element should be the most important of the three core elements, AI couldn't have developed to where it is today without algorithmic breakthroughs. for example, in recent years, behind the successful application of ChatGPT is the Transformer algorithm breakthroughs brought about.

(2) Data: Data is used to train AI, that is, AI algorithms learn implicit knowledge through a large amount of data. In principle, the larger the amount of data, the more knowledge the AI learns, and thus the more achievable the capacity.

(3) Computing capacity: Refers to the processing power of the computer, due to the algorithm of deep learning, a large number of parameters are involved, especially the general pertained transformer model represented by Chatgpt, whose number of parameters reaches 175 billion +. Since it needs to be trained to adjust each parameter of the AI, the amount of computation is huge and requires high performance computers to implement.

B. The Global Development of Artificial Intelligence

British media organisation TortoiseMedia recently released the 2023 global AI index ranking, as shown in Fig. 2. According to the data, the successful launch of ChatGPT in 2022 triggered a surge in global generated AI development, and Asian countries performed better in the list.

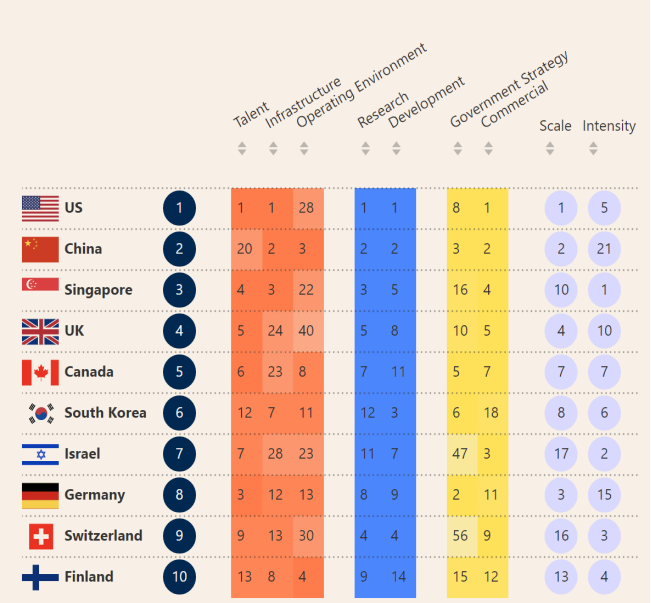

Fig. 2. Global ranking (from Google).

The chart in Fig. 2 uses three metrics-investment, innovation and practice-to determine how countries rank in terms of AI development, and the U.S. ranked first in all three metrics, excelling in investment in particular, thanks in large part to high scores earned in business investment, i.e., the activity of startups. China follows closely behind, with the US and China consistently in the top two since the list was first published in 2020. The UK, which had previously been in third place, was overtaken by Singapore for the first time this year. Singapore is ranked 14th in 2020 and rises to 6th in

2021, the country's AI development is very rapid. IT House previously reported that Singapore is leading the development of the first AI regulatory bill in Southeast Asia. In addition, South Korea and Israel ranked sixth and seventh on the list. Overall, it seems that two countries, the United States and China, maintain the leading position in AI technology, while Europe is obviously a little behind.

C. Application of Artificial Intelligence

Artificial Intelligence is widely used and has been integrated into various industries in society. The specific applications are as follows:

(1) Medical care: AI can be applied to medical image recognition, clinical diagnosis and treatment plan recommendation. With the help of deep learning and other technologies, AI can help doctors solve a large number of difficult and miscellaneous diseases in a short time, reduce the workload of doctors, and improve the accuracy and efficiency of clinical diagnosis and treatment. Fig. 3 shows the case of medical robots.

Fig. 3. Application scenarios of medical robots (from Baidu).

Artificial Intelligence is widely used and has been integrated into various industries in society. The specific applications are as follows:

(2) Traffic: AI can be applied to intelligent driving, vehicle management, traffic flow prediction and other aspects. With technological such as deep learning. AI allows vehicles to autonomously perceive the environment and road conditions, achieving a safer and more efficient driving experience, while also monitoring traffic conditions in real time and optimising traffic flow and route arrangements. Fig. 4 is an example.

Fig. 4. Self-driving car (from Baidu).

(3) Industrial sector: improving production efficiency and product quality. In the manufacturing industry, artificial intelligence technology is mainly applied to the optimisation and automation of the production process. Through real-time monitoring of various indicators in the production process, the intelligent system is able to detect and predict possible problems in the production process in a timely manner, thus avoiding human intervention and waste in production.

(4) Construction industry: AI can play a role in assisting project planning, preventing cost over expenditure and mitigating risks in the construction industry. Using artificial intelligence technology, it can realise the automatic capture of three-dimensional images on the construction site, and synchronise the data in the neural network to assist in the generation of better design solutions. If the application of artificial intelligence technology cannot meet the ideal expectations, then use manual processing. Showing in Fig. 5.

Fig. 5. Robotic arms for construction sites (from Baidu).

D. Artificial Intelligence Technology

(1) Machine Learning

Machine learning is a cross-discipline involving statistics, system identification, approximation theory, neural networks,

optimization theory, computer science, brain science and many other fields, the study of how computers can simulate or implement human learning behaviours, in order to acquire new knowledge or skills, and to reorganize the existing knowledge structure so that it can continuously improve its own performance, which is the core of artificial intelligence technology.

(2) Knowledge Graph

Knowledge Graph is essentially a structured semantic knowledge base, a graph data structure composed of nodes and edges, which describes concepts and their interrelationships in the physical world in a symbolic form. Its basic unit is the "entity-relationship-entity" triad, and entities and their associated "attribute-value" pairs. Different entities are connected to each other through relationships, constituting a mesh-like knowledge structure. In layman's terms, the knowledge graph is to connect all different kinds of information together and get a relationship network, which provides the ability to analyse problems from the perspective of "relationship".

(3) Natural Language Processing

Natural language processing is an important direction in the field of computer science and artificial intelligence, research can achieve effective communication between humans and computers in natural language with a variety of theories and methods, involving more areas, mainly including machine translation, machine reading comprehension and question and answer systems.

(4) Machine Translation

Machine translation technology refers to the use of computer technology to achieve the translation process from one natural language to another natural language. Statistical-based machine translation methods have broken through the limitations of previous rule-based and instance-based translation methods, and the translation performance has been greatly improved. The successful application of deep neural network-based machine translation in a number of scenarios such as everyday spoken language, has shown great potential.

(5) Semantic Understanding

Semantic comprehension refers to the process of using computer technology to understand a text chapter and answer questions related to the chapter. Semantic understanding technology will play an important role in intelligent customer service, product automated Q&A and other related fields, further improving the accuracy of Q&A and dialogue systems.

(6) Question and answer systems

Question and answer systems are divided into open domain dialogue systems and domain specific question and answer systems. Question and Answer system technology is the technology that allows computers to communicate with people in natural language like humans. People can submit questions expressed in natural language to a Q&A system and the system will return answers with high relevance.

IV. Research Work

The above content introduces the background knowledge of artificial intelligence, as well as the application of the situation in other industries, it can be seen that artificial intelligence has a successful and wide range of applications, especially in the financial and banking industry, as a major economic pillar industry of the country, the combination of artificial intelligence and the banking industry has a significant theoretical and practical value.

The application and development of AI in the banking industry has attracted the attention of scholars around the globe and has been explored in a number of ways, the main research focuses on the following aspects:

(1) The application of artificial intelligence in banks

The application of Artificial Intelligence (AI) in the banking industry has become a popular area of research, and many studies have shown that the application of AI in the banking industry is changing the traditional business model. Examples include intelligent customer service, risk control, and intelligent investment banking. Intelligent customer service can provide 24-hour service to resolve customer queries and increase customer satisfaction. Villar and Khan (2021) analyze the case of Deutsche Bank's use of Robotic Process Automation (RPA) in the banking industry and its use in two areas, tax and corporate services. It also analyses the financial and employee benefits of Deutsche Bank's use of RPA and its impact on the banking industry as a whole. Automation and standardisation of business processes have been achieved, increasing efficiency, reducing operational risks, shortening processing times and reducing labour costs, improving customer satisfaction and the quality of employees' work, and increasing the bank's competitiveness.

Mallawaarachchi (2019) explores the application of Artificial Intelligence (AI) and Interactive Voice Recognition (IVR) technologies in the Sri Lankan banking industry and the potential of these technologies to improve efficiency and customer satisfaction in banking operations. The potential of AI to automate and improve efficiency in banking services is validated.

Xie and Sun (2022) introduced a stock prediction application based on machine learning and big data analysis, in order to help stock investors to make decisions. By collecting and analysing stock market data for stock prediction, constructing prediction models based on machine learning algorithms, etc., it provides more accurate prediction and judgement basis for investment decisions. Provides investors with reliable support for stock investment decisions.

(2) Technological development

Advances in AI technology have opened up new possibilities for the banking industry. For example, deep learning can help banks identify fraud more accurately and protect the interests of both banks and customers (Nikita *et al.*, 2023). The paper describes an automated bank cheque processing system that aims to improve bank cheque processing efficiency and accuracy. The thesis describes the processes and problems associated with traditional bank cheque processing, including the need for a large amount of manpower, susceptibility to errors, and inefficiency. The paper then describes in detail the design and implementation of an automated bank cheque processing system, including the steps of cheque image acquisition, image processing, Optical Character Recognition (OCR) technology, cheque data analysis, and anomaly detection.

Deep learning is a machine learning technique that mimics

the neural network of the human brain, which can process large amounts of data and learn the intrinsic laws and patterns of the data to enable prediction and classification of unknown data. In the banking industry, deep learning can be used in scenarios such as credit card fraud detection and loan default prediction. In addition, machine learning can help banks to automate and optimise their business processes and improve efficiency (Agarwal 2019). The paper deals with the application of implementing artificial intelligence in the Indian banking industry to achieve successful strategies. The article provides an in-depth analysis of the application of AI in the Indian banking industry, specifically in the areas of loan appraisal, customer service, marketing strategies, and fraud prevention. Through AI, these problems can be solved faster and more accurately, thereby driving sustainable growth in the Indian banking sector. In addition, the paper discusses the impact of AI on the future of the Indian banking sector and how the banking sector should adapt to the changes in AI and other digital technologies.

Another important technology in Artificial Intelligence is Natural Language Processing (NLP). NLP is a technology that allows machines to understand and generate human language, which can be used in scenarios such as intelligent customer service, sentiment analysis, and text mining. In the banking industry, NLP can be used to enhance the customer service experience, understand customer needs, and extract valuable information.

Khan and Rabbani (2021) present a chatbot based on artificial intelligence and natural language processing techniques for Islamic banking and finance. The paper begins by describing the characteristics of Islamic banking and the challenges it faces, as well as the role of AI and natural language processing techniques in addressing these challenges. The paper then describes the definition, types and application areas of chatbots, as well as the steps and methods used to design and implement chatbots. The chatbot employs natural language processing techniques to engage in a natural dialogue with the user and provide automated answers to questions posed by the user. The chatbot is also self-learning and can continuously learn and optimise based on the feedback provided by the user.

Finally, reinforcement learning is a technique that allows machines to learn how to make optimal decisions by interacting with their environment. In the banking industry, reinforcement learning can be used in scenarios such as investment strategy optimisation, asset allocation, and trade execution. (Rustamov *et al.*, 2021) The paper begins by describing the difficult aspects of banking services, including the large number of customers and the high demand for service response. The paper then proposes a dialogue management system to solve these problems. The dialogue management system uses artificial intelligence technology to enable natural language dialogue with customers and reduce the workload of bank staff. The paper describes in detail the design and implementation of the dialogue management system, which includes several modules such as dialogue modelling, natural language understanding, dialogue strategy generation, dialogue act generation and speech synthesis (Mohd *et al.*, 2023).

Previous studies related to implementation of ethics in Al are analyzed; the literature results indicate that between 2010 and 2021, there were 150 Al ethical incidents; including data privacy and security risks, safety concerns, bias diagnosis, and the possibility of hostile entities taking control of Al.

(3) Privacy protection and legal ethics

The development and application of Artificial Intelligence (AI) raises many issues of privacy protection and legal ethics. The development and application of AI requires a large amount of data, which involves the issue of privacy protection. Many studies have shown that how to utilise data while protecting the privacy of users is an important issue. For example, some studies have proposed privacy-preserving data mining techniques which can exploit data for analysis while protecting user privacy. Bartneck (2020) and his company describe the privacy implications of artificial intelligence techniques. The paper begins with an overview of the application areas of AI technologies and explores specific privacy-related scenarios such as facial recognition, speech recognition, and image processing. As these technologies become more widely used, the protection of personal privacy becomes increasingly important.

The development and application of AI also raises a number of legal and ethical issues. For example, the issues of fairness, transparency and interpretability of AI decision-making. Many studies have shown that how to ensure the fairness of AI decision-making and how to improve the transparency and interpretability of AI decision-making are important issues that need to be addressed (Zhu *et al.*, 2021). The paper points out that AI and machine learning technologies have significant social and economic impacts, and increasingly they are seen as major drivers of future development. However, the ethical, legal, diversity, and global impact aspects of the technologies must be taken into account in their rapid development and diffusion. On the ethical side, AI and machine learning technologies can involve issues of morality, privacy, safety, rights and justice. On the legal side, AI and machine learning technologies raise issues of intellectual property, privacy protection, safety regulation and legal liability.

V. AI IN BANKS

The previous section mainly introduced AI and related knowledge and academic trends, then it can be seen that AI has a strong potential for application in the financial industry, then how artificial intelligence is healthy and stable in the banking industry and how to develop in the future, this section discusses the following three main aspects:

A. Current Application Status AI in Banks

AI can be applied to risk control management, investment decision-making, customer service and other aspects. With technologies such as deep learning, AI can help organisations make informed investment decisions and risk control strategies in complex financial environments by analysing and predicting large amounts of data. The application of AI in the financial and banking sectors has already brought about huge changes and demonstrated a positive impact in many areas.

Some of the main application of AI in finance and banking:

(1) Risk management and fraud detection: AI can analyse large amounts of data, identify risks and predict potential fraud. By monitoring transaction patterns, identifying abnormal behaviours and verifying customer identities, AI systems can help financial institutions detect and respond to various fraudulent activities in a timely manner, ensuring the safety and stability of the financial system.

(2) Credit assessment and loan decision-making: traditional credit assessment usually relies on a limited number of factors, while AI can conduct credit assessment based on a wider range of data sources. Using big data and machine learning algorithms, AI can more accurately assess a borrower's credit risk and improve the precision and efficiency of loan decisions.

(3) Investment and asset management: AI technology can help financial institutions and investors with intelligent investment and asset management. It can provide better investment advice and decision support while reducing transaction costs and risks by automating trading, predicting market fluctuations and optimising portfolios.

(4) Customer service and personalised recommendations: AI plays an important role in customer service. Through natural language processing and machine learning technologies, AI can enable intelligent assistants, chatbots and virtual customer representatives to provide personalised services and solutions to customers, increasing customer satisfaction and loyalty.

(5) Financial market forecasting and trading strategies: AI can analyse large amounts of market data and apply algorithmic models for forecasting and trading strategy generation. It can identify potential market trends, spot price fluctuation patterns and execute high-speed trades, providing more accurate investment advice and trading decision support.

(6) Automation and claims processing in the insurance industry: AI technology can help insurance companies improve the efficiency and accuracy of the approval process. Through automated processing, image recognition and natural language processing, AI systems can complete tasks such as claims processing, loss assessment and fraud detection in a short period of time, reducing manual operations and lowering costs.

It needs to be emphasis that despite the wide range of applications of AI in finance and banking, there are some challenges and risks, such as data privacy and security, algorithmic bias and interpretability, and ethical issues. Therefore, while promoting the application of AI technology, there is a need to develop appropriate regulatory measures and ethical frameworks to ensure its rational use, maximise its potential and protect users' rights and interests and the interests of society.

B. Future Development of AI in Banks

(1) Technical level

The banking industry has already started to apply AI technology in areas such as risk management, credit rating, and customer service. Here are some suggestions in Table 1 from Big Language Models that can help banks further improve the application and intelligence of AI in the banking industry:

Table 1. Specific application and effects

Applications	Application Effects
Develop personalised financial products and services	AI technology can help banks provide more personalised financial products and services to meet customer needs. By analysing customers' behaviours and data, it can provide customers with better services.
Enhancing risk management and anti-fraud	AI technology can help banks better monitor and manage risks, which can help banks improve their ability to identify and prevent illegal behaviours and reduce financial anti-fraud costs and time.
Build smarter customer service and management	AI technology can make bank customer service smarter, for example, By automatically answering customer questions, personalising recommendations and quickly resolving complex financial issues.
Integrate blockchain technology	blockchain technology can provide banks with more reliable transactions, simpler withdrawals and fund transfers, and faster execution. By integrating blockchain technology, banks can improve the efficiency and security of transactions, while also better protecting customer privacy and information security.
Developing smart wealth management and investment	Banks can use AI technology to track and analyse their customers' financial data to provide them with more accurate investment advice and efficient asset allocation solutions, while also helping to increase their business revenue.

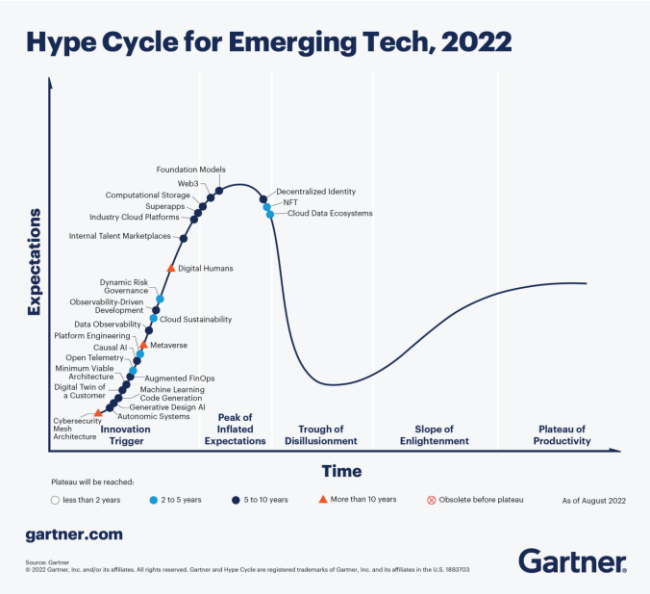

Fig. 6. Emerging technology curve chart.
(source: Gartner)

(2) Law and regulations

The central bank issued the "Financial Technology Development Plan" with the policy of global support for artificial intelligence as shown in Table 2.

Table 2. Policy support from the state

Country	The Policy Introduced	Summary of Content
America	"White House Artificial Intelligence Strategic Plan" (2019)	Strengthen the training and development of AI research and development talents; Enhancing the quality and effectiveness of AI applications and promoting the development of the AI ecosystem; Strengthening AI cooperation with key U.S. allies and partner countries.
China	"New generation of artificial intelligence development plan" (2018)	Promote the rapid development of AI technologies and applications, and use AI technologies to improve economic quality, efficiency and competitiveness; Promoting multi-disciplinary co-operation to create a healthy and harmonious AI industry ecosystem; Cultivating innovation and talents, and promoting international cooperation and technical standards.
Japan	"Infrastructure development strategy for future economic and social reform" (2017)	Building digital infrastructure and enhancing data collection, processing and sharing; Promoting the application of AI technology in enterprise production, transport, healthcare and other fields; Promoting the standardisation of AI technologies and the protection of intellectual property rights.
Australia	"Artificial intelligence strategy" (2019)	Supporting research and development of artificial intelligence and strengthening joint research, data sharing and intellectual property rights; Promote the use of AI technology and its application in areas such as healthcare, finance and the military; Strengthening collaboration with the international and private sectors to accelerate the commercialisation of AI technologies in Australia.

C. Existing Challenges and Countermeasures

1) Challenges of artificial intelligence in the development of the banking industr y

Artificial Intelligence (AI) is one of the hottest technological developments at the moment, and while it plays a huge role in a variety of fields, there are still some perceived drawbacks.

(1) Unemployment risk: The rapid development and widespread application of AI has indeed brought about technological innovation and efficiency gains in a number of industries, but it has also given rise to certain concerns, one of which is the question of the increased risk of unemployment that may result from AI. With the increasing intelligence of AI, its application in many fields has begun to replace traditional human labour. For example, in the manufacturing industry, automation and robotics are replacing some heavy, repetitive work, which has led to the loss of employment opportunities for some workers. In addition, in the financial sector, intelligent algorithms and automated systems can perform some tasks that were previously performed manually, such as data analysis and transaction processing, which may reduce the need for human resources. However, it is important to note that AI does not exclusively mean an increase in unemployment. While some jobs may be replaced, new jobs will also be created. As AI becomes more widely used, the demand for technicians who need to specialise in developing and maintaining AI systems increases, such as AI engineers, data scientists, and algorithm specialists. In addition, AI has given rise to a number of new industries, such as virtual reality, driverless, and smart healthcare, which provide more choices in the job market. In order to deal with the unemployment risk posed by AI, society and the government can take a number of measures. First, the importance of vocational education and training cannot be ignored. By providing people with training in AI-related technologies and fields, they can be adapted to the needs of the emerging industry and gain access to employment. Second, the government can promote the development of innovative industries and encourage companies to create more jobs in emerging fields. In addition, flexible labour market policies and social security systems can help mitigate the adverse impact of unemployment risks on individuals and families. Overall, while the development of AI may lead to the disappearance of some jobs, it will also create new jobs. The key lies in how we can actively respond to such changes, upgrade our skills and adapt to the new employment practices and demands. With reasonable policies and measures, we can maximise the benefits of AI technology and reduce its negative impact on the job market.

(2) Privacy issues: with the development of AI technology, the protection of our privacy and personal information becomes an increasingly serious issue. AI may steal personal data and use this information to manipulate users. Firstly, large-scale data collection and processing may lead to personal privacy leakage.AI systems require a large amount of data for training and learning, and this data often contains users' personal information. If this data is not adequately protected and subject to strict access control, it may be stolen or misused by unauthorised people, posing a risk to user privacy. Second, AI algorithms have potential bias and discrimination issues. Since the training data of AI

algorithms are derived from the realities of human society, there may be biases in terms of race, gender, age, etc. in them. If these biases are not effectively corrected and amended, AI systems may treat certain groups unfairly when making decisions, violating their privacy and equality rights.

(3) First, privacy and data security are important issues in the ethics of AI. AI systems rely on large amounts of personal data for learning and decision-making, making it a necessary consideration how to protect user privacy and data security. Ensuring transparency, compliance, and security in data collection, storage, and use is essential. Secondly, fairness and discrimination is another key issue related to AI. As AI training data may reflect human biases and inequalities, they run the risk of unconsciously transmitting these biases into the decision-making process and outcomes. Ensuring that AI systems are fair and free from discrimination is an important task that needs to be addressed.

A further concern is responsibility and accountability. When AI systems produce errors or cause harm to humans, the question of how to hold them accountable and ensure appropriate remedies is an important one. Establishing transparent decision-making processes, interpretable algorithms, and monitoring and auditing mechanisms can help increase the responsibility and accountability of AI systems. In addition, ethical issues also need to be considered with regard to the impact of AI on employment and social relations. The widespread use of AI may lead to the disappearance of certain jobs and changes in the labour market, and it is important to ensure that relevant socio-economic issues are dealt with in a fair manner and that the quality of human life is improved. Overall, evaluating AI in terms of ethical issues requires a comprehensive consideration of its potential advantages and challenges. Through the development of appropriate laws and regulations, technical guidelines and ethical standards, as well as interdisciplinary discussions and cooperation, we can promote the sustainable development of AI and maximise its potential, while protecting the rights of individuals and the interests of society.

2) Countermesures

In order to meet the above challenges and standard the healthy development of artificial intelligence in the banking industry, the following measures are recommended:

(1) Strict laws and regulations need to be established to regulate the behaviour of AI systems in data collection, processing and use, and to strengthen the penalties for violations. Second, security protection of data should be strengthened, including technical means such as data encryption, access control and identity authentication. There is also a need to promote transparency and interpretability research so that users can understand how AI systems use their data and make choices accordingly. In summary, although AI technology has brought about privacy deficiencies while improving life, we can effectively address these issues and protect the security of user information through a combination of legal regulation, technical means and user education. Strengthening regulation: the government should strengthen the management of AI technology. Improve the transparency and ethical standards of AI by strengthening the regulation of citizens' privacy and data protection.

(2) Co-operation between academia and business: The academic and business communities should work more closely together to enhance the development and application of AI technologies. The business community can provide a large amount of data and funding, while the academic community can provide expertise in deep learning, natural language processing, etc., to promote the development of AI technology. Pursuit of sustainability: In the application of AI technology, sustainability needs to be pursued. Therefore we need to consider environmental and social issues in the development and application process.

(3) Increased AI autonomy: Future AI technology should have a higher degree of autonomy. This means that AI should be able to learn and make decisions independently without constant human intervention or supervision.

(4) Improve public education: We need to strengthen the training of the public in AI knowledge and scientific and technological literacy. Strengthen education and publicity to improve the public's scientific quality to meet the new challenges of the AI era. We need to rationally develop AI technology and solve the problems people face, while ensuring the sustainability and transparency of the technology and guaranteeing sustainable human-machine cooperation.

To ensure that AI develops without compromising human interests and values, and to greatly reduce its potential negative impacts, the following controls need to be put in place: the development of, and adherence to, clear ethical guidelines and laws and regulations that limit the scope of behaviour of AI systems.

Pay attention to security design when developing AI systems and incorporate multiple protection mechanisms, including access control, authentication, and vulnerability remediation, to prevent malicious exploitation or misuse. Ensure that the decision-making process of the AI system is traceable and explainable so that its behaviour can be reviewed and understood to avoid unpredictable or uncontrollable situations.

VI. Conclusion

The rapid development of Artificial Intelligence (AI) has brought about a great transformation to all industries, how to use AI to enhance the level of digital intelligence in the industry and promote the rapid development of the digital economy is an important research topic. This report mainly takes the banking industry as the research object to explore the current situation of the application of artificial intelligence in the banking industry and the future development, respectively, from the technical point of view, the application of the current situation, the policy environment factors, etc., comprehensively discusses how artificial intelligence affects the banking industry, as well as future development trends, through the actual data support, the study believes that artificial intelligence in the banking industry has a huge potential for development, and can bring assistance to the digital transformation of the banking industry. digital transformation, but there are also problems and challenges such as data privacy, laws and regulations, unemployment, etc. Therefore, in order to ensure the stable development of the banking industry, this paper puts forward corresponding measures and suggestions, such as

strengthening the formulation of laws and regulations, and paying attention to the safety and audit of AI. This study can provide guidance for the development of AI in the banking industry and provide support for policy makers with strong application value.

CONFLICT OF INTEREST

The author declares no conflict of interest.

REFERENCES

Agarwal, B., Agarwal, H., & Talib, P. 2019. Application of artificial intelligence for successful strategy implementation in Indias banking sector. ***International Journal of Advanced Research,*** 7(11): 157–166.

AI-Tahat, S., & Osama, A. M. 2020. ***The Impact of Artificial Intelligence on the Correct Application of Cyber Governance in Jordanian Commercial Banks.*** Available: Internet, Corpus ID: 214780185

Arinola, A. F., & Olalekan, A. 2023. Artificial intelligence & internal audit quality of commercial banks in Nigeria. ***International Journal of Management and Economics Invention,*** (09)04.

Baihakki, M. A., & Mohamed S. B. Q. S. 2023. Ethical issues of Artificial Intelligence (AI) in the healthcare. ***Journal of Science, Technology and Innovation Policy,*** 9(1): 32–37

Bartneck, C., Lütge, C., Wagner, A., & Welsh, S. 2020. Privacy issues of AI. ***An Introduction to Ethics in Robotics and AI:*** 61–70. Cham: Springer International Publishing.

Chammika M. 2019. The application of Artificial Intelligence and the interactive voice recognition in the banking industry in Sri Lanka. ***Journal of Modern Accounting and Auditing,*** 15(6).

Chwila, A. 2023. The application of Artificial Intelligence models in commercial banks–opportunities and threats. ***Acta Universitatis Lodziensis. Folia Oeconomica,*** 63–98.

Khan, S., & Rabbani, M. R. 2021. Artificial Intelligence and NLP-based Chatbot for Islamic banking and finance. ***International Journal of Information Retrieval Research,*** 11(3): 65–77.

Mohod, N., Guhe, N., Adwani, A., Upase, K., & Nimbolkar, V. 2023. Automated bank cheque processing system. ***International Journal for Research in Applied Science and Engineering Technology,*** 11(4): 4263–4268.

Rustamov, S., Bayramova, A., & Alasgarov, E. 2021. Development of dialogue management system for banking services. ***Applied Sciences,*** 11(22): 10995.

Villar, A. S., & Khan, N. 2021. Robotic process automation in banking industry: A case study on Deutsche bank. ***Journal of Banking and Financial Technology.***

Xianke, Li. 2021. ***Application and influence of artificial intelligence technology in commercial banks.*** Paper presented at 2021 2nd International Conference on Computer Science and Management Technology (ICCSMT).

Xie, A., & Sun, Y. 2022. ***A stock forecasting app using machine learning and big data analysis to help guide decision making when investing in the stock market.*** Paper presented at 8th International Conference on Artificial Intelligence and Fuzzy Logic System (AIFZ 2022).

Zhu, L., Xu, X., Lu, Q., Governatori, G., & Whittle, J. 2021. AI and ethics—operationalizing responsible AI. ***Humanity Driven AI:*** 15–33. Cham: Springer International Publishing.