

# The Challenges of Banking in the Age of Artificial Intelligence

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## Abstract

*Banking systems play an essential role in the economy through their varied functions. They facilitate access to credit, ensure efficient money management and promote the smooth functioning of financial markets.*

*In the current period, in financial and credit institutions there is an orientation towards the use of AI. Thus artificial intelligence has been introduced in bank asset management, in analyzing and assessing the risks of bank customers, in bank marketing, etc.*

*The aim of the paper is to present the current AI technologies used in banking, highlighting the transformations that the field has undergone in recent years as a result of the implementation of AI. Moreover, the benefits, but also the risks that may arise for all actors participating in the banking market will be highlighted. We focus our attention on AI because it stimulates innovation in industry and opens the way to new business opportunities.*

**Key words:** Artificial intelligence, banking, regulation

**J.E.L. classification:** G01, G20, G21, G24, G30, E50

## 1. Introduction

The banking system plays a pivotal role in the global economy and is a fundamental pillar of it. It facilitates financial transactions, promotes economic growth and provides essential services to individuals, businesses and governments. In this paper, we aim to explore a range of issues related to the banking system, with a focus on IA in banking, regulations, technological advances, challenges and the evolving landscape of banking in the digital age.

AI as a science of new technology has reached a stage of development that allows integration in financial areas under acceptable risk. If the intelligent machine is mature enough, it can simulate human behavior. As a result, banks, regulators, financial market players are increasingly interested in using AI in market analysis, risk or asset management. In the following, we will present issues that concern both edges of the sword: the competitive advantages that the financial banking industry gains by using AI, but also the multiple risks that accompany AI.

## 2. Theoretical background

The banking system performs key functions in modern economies. As financial intermediaries, banks facilitate the transfer of funds from surplus to deficit units. The banking system provides payment and settlement services, facilitating the fast and secure transfer of funds between individuals and businesses by various means, such as electronic transfers, debit or credit cards. All these services are vital for facilitating economic transactions and ensuring an efficient financial system.

In order to ensure the stability and integrity of the banking system, regulatory and supervisory frameworks have been put in place by central banks and other type of financial authorities. The regulations cover a few issues: capital adequacy, capital adequacy requirements, liquidity standards, consumer protection or risk management. Regulators monitor, supervise banks to reduce risks, prevent fraud and maintain the overall financial system. The purpose of these regulations is to promote transparency and accountability, protect depositors' funds and maintain public confidence in the banking sector. After the 2008 global financial crisis, regulatory reforms were implemented to strengthen the resilience of banking systems and improve risk management practices.

At the same time, banks have had to adapt to technological change, respond to customer needs and comply with evolving regulations in order to perform their functions effectively and contribute to a stable and prosperous economy.

But the challenges are not over, and artificial intelligence is a presence worth taking note of. Digitalization in banking has brought benefits but also new risks.

The traditional financial industry has adapted to new technologies, and the changes have also seen changes in banking. Traditional banks have adopted artificial intelligence to develop mobile banking applications, but certainly this utilization is wider. However, there is not much data in this field ( Lee & Chen, 2022).

The development status of AI in finance as well as specific risk issues are presented by Li, Yi, Chen and Peng (2021). Given the importance of financial markets globally, the authors analyze issues on the application of AI on a large scale. Their research is conducted on five directions including fraud prediction and credit risk management.

### **3. Research methodology**

In recent years, the banking sector has undergone significant technological transformations, leading to the emergence of digital banks and a wide range of digital banking services. Technological advances in information and communication technology have enabled banks to offer online banking, mobile banking applications and electronic payment systems (Dwivedi et al., 2023). These innovations have significantly improved convenience, accessibility and efficiency for customers, enabling them to bank anytime and anywhere.

Mobile banking apps have become a key element in today's banking landscape. They allow customers to quickly and easily access banking services, including functions such as balance inquiries, fund transfers, bill payments and investment portfolio management (Li et al., 2018). The number of mobile banking app users has increased significantly in recent years, reflecting the growing demand for digital and convenient banking services.

In addition to mobile apps, advanced technologies such as artificial intelligence (AI), machine learning and blockchain have brought significant transformations to the banking sector. AI and machine learning are being used to develop sophisticated fraud detection and financial data analytics systems, helping banks to prevent and detect fraudulent activities (Li et al., 2021) . For example, AI algorithms can identify suspicious spending or transaction patterns and alert banks and customers in a timely manner.

Studies on the use of artificial intelligence in banking are quite scarce and data are limited. Lee & Chen in 2022 conducted a research based on stimulus-organism-response (SOR) theory. This study was generated by the need to fill this gap. Lee and Chen wanted to find out what is the cost of using AI in banking from the perception of mobile banking app users.

The ECB has also been working to bring the use of AI techniques up to date through regulation.

The ECB welcomes digitization in banking, but draws attention to the associated costs and risk management.

Especially after 2022, regulations, impact studies and research are carried out in ECB departments to respond to the new reality because it is a fact that European banks are placing great emphasis on adapting to new technologies.

The risk-profit relationship being key in banking, it can be observed that many institutions are moving part of their activities exclusively online. Banks that operate exclusively online and use bots and artificial intelligence to interact with customers are emerging. Monetary authorities are expected

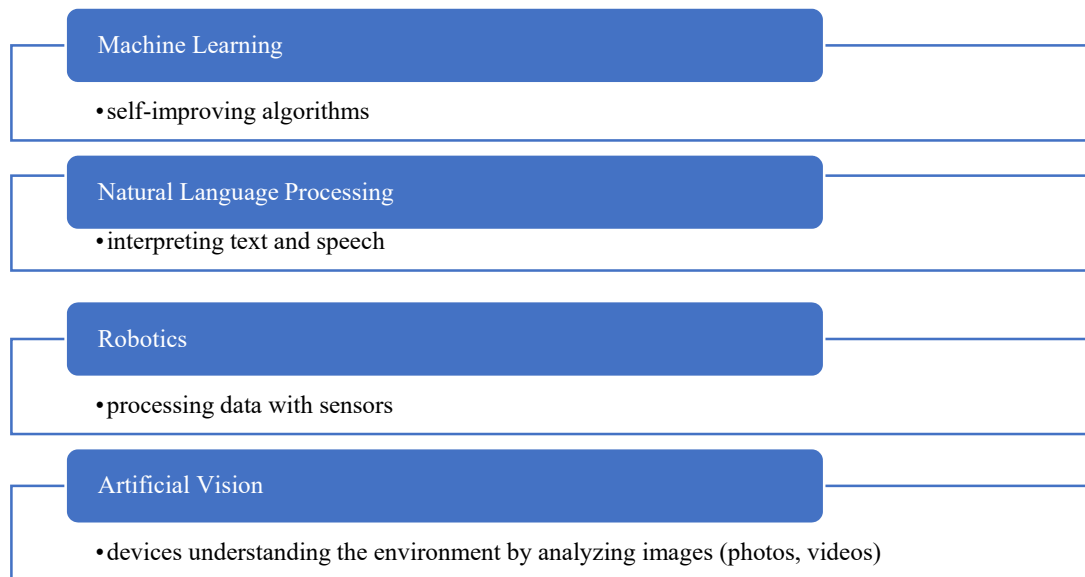
to be more present in the banking market as corporate governance actors. On the one hand, we expect visits of central bank representatives to systemic banks to take place more often.

#### 4. Models and algorithms in banking

In the early days, artificial intelligence was limited to sequential data processing and the use of logic. Later a more modern method of artificial intelligence was used by building a computer with a structure that mimics the human brain. This AI technology is called neural computation or artificial neural network (ANN).

From the first models to widely used AI, many steps have been taken relatively quickly.

Figure no. 1 AI variants



Source: Authors' conception

The Ai components used as models in banking are shown in Fig 1.

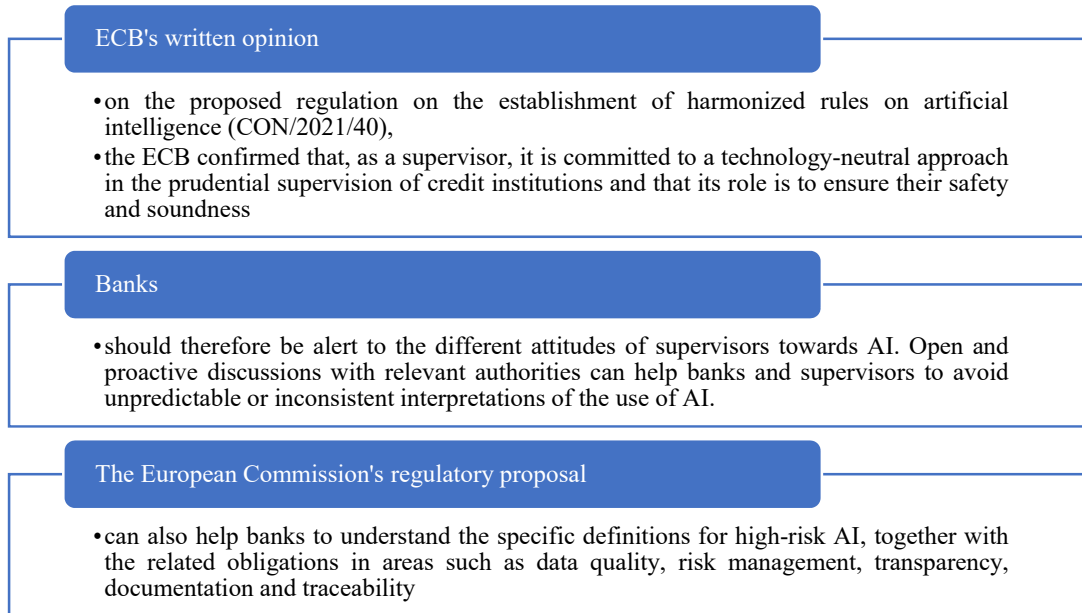
Blockchain, a technology based on distributed ledger and cryptography, has the potential to revolutionize the way transactions and clearing are conducted in the banking sector.

The use of blockchain can reduce reliance on intermediaries and ensure fast and secure transactions between parties (Ali et al., 2020) In addition, blockchain technology can bring transparency and security to the banking system, eliminating the risk of fraud or human error

These technological advancements have not only benefited banks and customers, but also have a widespread impact on the entire financial system and economy. The use of technology in the banking sector can help increase operational efficiency, reduce costs and improve risk management. Emerging technologies can also spur innovation in the industry and create new business opportunities.

Models that use facial recognition identification to perform ATM transactions, it has been found that significant errors can occur. So the system needs to be refined from a security perspective.

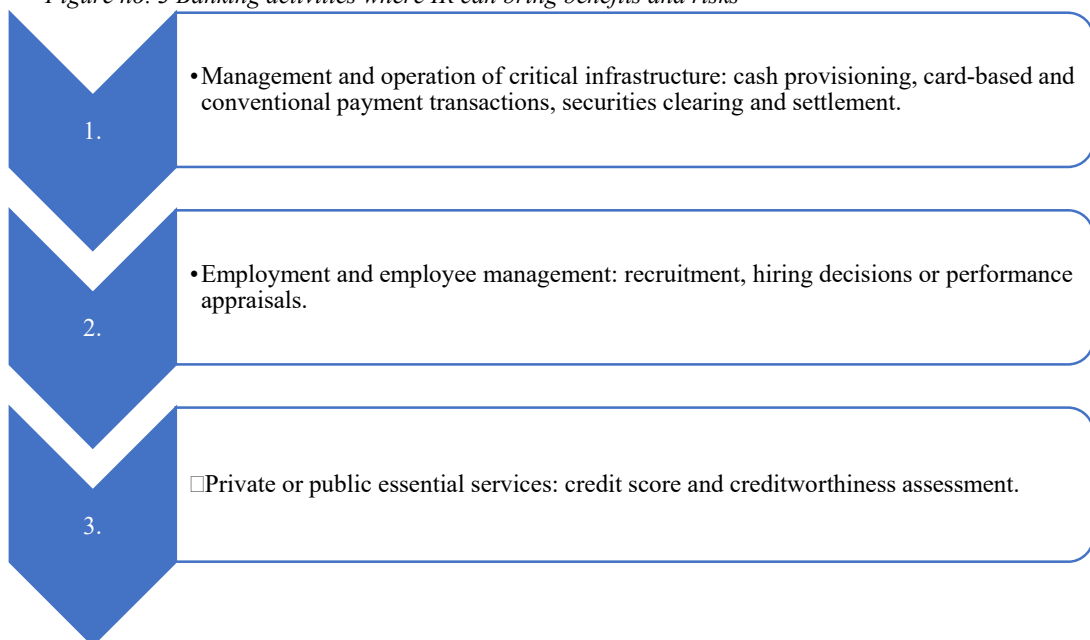
Figure no. 2 Reglementations and AI



Source: Authors' conception

However, it should be pointed out that anti-fraud algorithms have proven their usefulness many times. Convolutional neural networks (Fu et al., 2016), feature engineering strategies (Bahnsen et al., 2016), Bayes minimum risk method (Bahnsen et al., 2013) and hidden Markov model (Bhingarde et al., 2015) are used to prevent financial fraud on the Internet. All these models are used to detect fraudulent transactions.

Figure no. 3 Banking activities where IR can bring benefits and risks



Source: Authors' conception

The ECB, the monetary authority with a role in banking supervision, is part of this process of accommodating AI in banking (fig 2).

The role of digitalization in the bank-customer relationship is essential in this period. Cerchia and Zaif studied customer relationship management in Romanian banks, and the model is replicable. (Cerchia & Zaif, 2019)

In banking, high risks can arise when AI is used in certain situations. These are presented in Fig. 3.

## 5. Conclusions

The value of applying AI technology is so far difficult to estimate. But it is certain that financial entities applying AI are already realizing competitive advantages.

The future of banking is closely linked to the use of artificial intelligence. Several benefits have emerged from the reviewed studies, which are summarized in Fig. 4.

Figure no. 4 Benefits gained by using AI in banking system

<p>AI has truly transformative potential in banking. Its development and adoption is growing rapidly and is expected to accelerate further as post-COVID investment intensifies. For banks, there are the following potential benefits:</p>		
<p>Improve efficiency: Reduce costs and increase productivity by using AI for core processes in areas such as finance, compliance, risk management and administrative tasks.</p>	<p>Revenue generation: Use AI to improve segmentation, anticipate customer needs or create new products and services.</p>	<p>Risk mitigation: applying AI in risk analysis in areas such as lending decisions, market risk or insurance underwriting - thus improving institutional stability and system stability.</p>

Source: Authors' conception

In the light of the new technology, AI can pose potential risks if implemented without adequate controls over its actions and the data used. Some of the main risks include reduced accountability and transparency, the potential for bias or discrimination, data misuse or privacy breaches, and the potential for financial instability due to too much reliance on third parties in the future.

In recent years, the banking sector has undergone significant technological transformations, leading to the emergence of digital banks and a wide range of digital banking services. Technological advances in information and communication technology have enabled banks to offer online banking, mobile banking applications and electronic payment systems (Dwivedi et al., 2023). These innovations have significantly improved convenience, accessibility and efficiency for customers, enabling them to bank anytime, anywhere.

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