# AI IN BANKING: SOCIO-ECONOMIC ASPECTS

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**Abstract.** Artificial intelligence is revolutionising the banking sector, offering a range of benefits such as enhanced customer support, improved fraud detection and more informed decision-making. Banks are using AI technologies to optimise their operations, improve customer service, and proactively manage risks, leading to increased efficiency and productivity. The article is devoted to the issue of studying the use of artificial intelligence in the banking sector. The purpose of the article is to explore the potential of artificial intelligence for the banking sector. The article uses methods of data analysis and synthesis, systematisation and comparison. The article uses statistical data from the World Bank, the State Statistics Service of Ukraine and other official websites. The authors analyse the positive and negative aspects of the use of artificial intelligence in the banking system. Artificial intelligence technologies allow banks to process large amounts of structured and unstructured data to predict market trends, gain insights and identify investment opportunities, which ultimately leads to better decision-making. In banking, the main purpose of AI is to help consumers by prioritising their choices. AI also helps to ensure that customers are satisfied with the bank's services. The paper presents a statistical analysis of GDP growth, inflation and public debt in some countries of the world. With the emergence and spread of FinTech and DeFi technologies and the introduction of CBDC, the system of control and regulation of cash flows is becoming more complex. The practical value of the publication lies in the authors' recommendations on the application of artificial intelligence in the banking sector. The authors suggest ways to maximise the positive effect of artificial intelligence in the banking sector.

**Keywords:** AI, financial services, banking sector, FinTech, big data, socio-economic development.

**JEL Classification:** E58, B26

## 1. Introduction

Artificial intelligence (AI) mimics human cognitive processes using machines, particularly computer systems. Frequently referred to as machine intelligence, AI is increasingly being adopted in the banking sector due to its role in managing vast databases of the world's wealth and facilitating information transactions across networks (Lukianenko, Simakhova, 2023). The implementation of AI in the industry offers numerous benefits, improving areas such as accounting, sales, contracts and cybersecurity. In addition, banks are increasingly partnering with financial technology (FinTech) companies to use AI to provide enhanced banking solutions during the production process.

According to a report by Business Insider, banks are expected to save 447 billion USD by the end of 2023 through the implementation of AI applications. This huge figure demonstrates the revolutionary impact of AI in the banking industry. Here's a quick chart showing the regional business value of AI in the global banking industry from 2018 to 2030 (Business Insider Intelligence, 2023).

In recent years, the banking industry has seen groundbreaking advances through the use of cutting-edge technologies. Banks are also expanding their reach into retail, information technology and telecommunications to offer services such as mobile banking, e-banking and real-time money transfers. By using cognitive AI technology, banks can benefit from digitalisation and remain competitive against agile FinTech companies. According to research from the National Business Research Institute and Narrative Science, nearly 32% of financial service providers are already using AI services such as speech recognition and predictive analytics. The adoption of AI in banking

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is being driven by several factors, including increased competition, demand for process-driven services, consumer preferences for personalised solutions, increased employee productivity, integration of software robotics to augment human work, improved operational efficiency and more effective decision-making.

Researchers such as Biswas et al. (2020), Boobier (2020), Burgt (2020), Rahman M., Ming T. H., Baigh T. A., Sarker M. (2023) and many others have studied the use of AI in banking. The work of these scholars has examined the future of AI in banking, the use of AI in banking services, and areas for improvement in the use of AI in banking. This issue of the potential of AI for the banking system is not sufficiently explored in the academic literature, which determines the relevance of this study.

The purpose of the article is to study the potential of AI for the banking sector. In order to achieve the purpose of the article, the following tasks were set and solved: theoretical analysis of aspects of the use of AI in the banking system; study of the dynamics of financial indicators in the countries of the world; proposal of directions for the use of AI in the banking sector.

## 2. Methodology

The paper uses general scientific methods of data analysis and synthesis, as well as systematisation and comparative analysis. The information base of the study was formed by scientific articles, data from international organisations, and Internet resources.

## 3. Results

Big data is now the best option, and every company is trying to extract as much information as possible from unstructured databases. Artificial intelligence in the fintech sector is already being transformed by big data applications. Artificial intelligence has become a reality. The finance and banking industry is stepping in to use this data to improve customer relationships, not only by taking advantage of AI to extract and organise the data at hand.

What is more significant and relevant for banking and financial matters – the use of social machines or the expansion of the space of artificial sociality? Why?

In the context of banking and financial matters, both phenomena have a significant impact, but their relevance and significance varies depending on the specific aspects of banking activities and objectives.

Social machines in finance social machines, including digital platforms, mobile applications and internet banking, play a key role in modern banking. They allow for: increased accessibility and convenience of banking services, making them available 24/7 from anywhere in the world. Optimising customer interactions by providing personalised financial advice and recommendations based on data analysis of transactions and customer behaviour. Speed up and automate processes such as lending, payment processing and fraud prevention, reducing operational risks and costs. These aspects have a direct impact on the efficiency, security and customer focus of banking activities, making the use of social machines highly relevant to the financial industry.

Many banks are confused about upgrading or adapting to new methods. Because they are standardised with fixed processes in traditional methods, some locations in tier two and three cities across the country face this challenge. They also lack the commitment to upskill their staff and human resources.

Banks that use AI on a larger scale are required to comply with government regulations. The increase in the number of services, such as internet banking and online transactions, is subject to privacy legislation, which requires banks to comply with it.

In successful business practices, real-time data and information have long been the basis for effective decision-making. The same principle is now poised to revolutionise central banking, heralding a new era of monetary policy based on speed and accuracy. Using advanced technologies such as CBDC, artificial intelligence and big data, central banks can step into the future by making decisions based on up-to-date, comprehensive data rather than outdated reports and lagging indicators. This shift promises to have a significant impact on the health of the economy and, more importantly, on the well-being of citizens.

Obviously, commercial banks are appropriating the concept of blockchain to coordinate their oligopolies, and crypto entrepreneurs are appropriating the concept of pegging to a stable currency and calling them stablecoins. And companies like Facebook are appropriating both to create stablecoins driven by digital oligopolies or big data. Bitcoin technology has given the world pseudonymous, relocatable tokens, but they have not been able to circulate as money, and stablecoins, while remaining third-tier electronic money (commercial bank (CB) money backed by CB money – stablecoins backed by CB money), are still mostly dependent on banks. So far, banks are only approaching the idea of CBDC (Central Bank Digital Currency), when cash issued by the government can be converted into an electronic version. However, all banks understand that the disappearance of cash will lead to the growth of the electronic banking system, and this niche will be captured by big data megacorporations, as Amazon and Facebook have already tried to do with their Libra.

It is understandable that digital platforms would be more comfortable with CBDC than with bulky cash that needs to be constantly transported to all the

parts of the world where these giants are entrenched. On the other hand, CBDC has all the drawbacks of electronic money, including the possibility of oversight, censorship and a gradual slide into corporate capitalism. Some of these problems could be solved if CBDCs borrowed from the crypto world and implemented closed blockchain systems in which people store government money at addresses using pseudonyms. This would be true "electronic cash". CBDCs could then weaken the power of the commercial banking sector. If central banks issue cash, then commercial banks create e-cash! Cash is of course used in the shadow economy, but it is a small part that is accounted for in balance sheets and allows for auditing, its consequences can still be dealt with, but once corporations and cybercriminals get state "e-cash" they will be able to unleash full power, as the speed of delivery of such money will be instantaneous, without quotas and controls at airports and borders, and it will be almost impossible to implement declarations in the reporting of digital platforms without controlling their real balance sheets, because of the deepening corruption and expansion of the financial sector.

Stablecoins and CBDCs certainly have an impact on the monetary system, but all of these electronic means, despite their differences, have an important common feature: they can be embedded in the operation of digital platforms and can even be issued and managed through these platforms. At the same time, CBDCs are considered "programmable" money, with certain design elements and attributes that can be embedded in them, so any central bank cannot do without artificial intelligence when processing data in the face of a huge flow of payments and various payment terms. In all types of CBDC architecture (single-tier or two-tier), the central bank is the only institution that issues and redeems CBDCs.

The fight against cash is well illustrated by the example of Sweden. Only eight per cent of Swedes used cash for recent purchases in 2022, down from 40 % in 2010, according to a survey by Sweden's central bank, the Riksbank (Barrons, 2024). However, government officials have recently turned their attention to the use of already thinly-functioning ATMs, which saw a 30 % increase in withdrawals following the Russia's invasion of Ukraine in February 2022. According to the European Association of Money Management Companies, a similar trend has been observed in several other European countries, such as the Czech Republic and Slovakia.

The Swedish government, which has set up a parliamentary commission on the issue, believes that it should be possible to pay cash for certain goods, such as food, fuel and medicine.

"It's hard to pay in cash in Sweden today," said Denis Dukarev, chairman of a parliamentary committee, who noted that one million Swedes are excluded from the digital world (Barrons, 2024). He said it is important to have more than one payment system available, especially in times of crisis.

The most familiar form of money – cash – continues to stand in the way of the merger of finance and technology, which in this case is not even helped by AI. Corporate capitalism has an innate desire for constant expansion, for which it connects the world through transnational networks, giving AI the ability to manage these networks. The monetary central nervous system of big data is concentrated in large market institutions (Central Bank, MNCs), but on the periphery in the form of cash, and this peripheral system has so far distanced itself from large institutions. For multinational corporations, the main task is to destroy this peripheral cash system and replace it with money stored in electronic cash flow control centres. For this purpose, commercial banks and big data giants are financing and developing the FinTech system, while striving for a complete monopoly in all areas. The European Union has launched an investigation into Apple, Google and Meta on suspicion of violating the Digital Markets Act (DMA), which, among other things, obliges large technology companies to open their platforms to competitors. Three US companies failed to comply with the requirements (CBS NEWS, 2024). Meanwhile, four countries – Austria, Holland, India, and Mexico – have made the right of their citizens to use cash a constitutional right (Manuel A. Bautista-González, 2022), and a number of states have introduced articles in their legislation that establish the national currency as the sole means of payment.

Central bankers understand that if they allow cash to die, it will lead to the dominance of commercial banks; if they offer CBDC instead, they can destabilise these commercial banks, from which customer deposits will start to flow to the CB, where it is safer for customers to keep their money, many fees are absent or minimal, all transfers are faster as intermediaries are eliminated. These processes are described in the ECB's workbooks. Central banks are actively exploring the idea of a digital anonymous currency – tokens that will circulate in a decentralised manner without a central registry. This is due to anonymity, which means that the central bank will not know who currently holds the issued tokens (as in the case of banknotes). Traditional ledger systems and tokenised systems operate under fundamentally different rules. The claims traded on programmable platforms are called tokens. Tokens are not just digital records in a database. Rather, they integrate the records of the underlying asset that would normally be contained in a traditional database with the rules and logic that govern the transfer of that asset (BIS Annual Economic Report, 2023).

To make cryptocurrency a decentralised alternative to conventional banking, it is necessary to extend its capabilities beyond simple token transfer. So the goal was to turn tokens into a kind of electronic key to access things in the real world. The Ethereum community created digital vending machines, which are responsible for the correctness of transactions and allow the construction of systems whose destruction and violation of the rules would be unprofitable. In the Ethereum system they are called smart contracts. They are like small programs waiting to be activated on the network. Most likely, in the future, AI will be responsible for writing these programs.

Stablecoins are now linked to the conventional monetary system and are used as the basis for decentralised financial platforms (DeFi) (OECD, 2022). Just as conventional fintech companies rely on bank-based e-money, DeFi are linked to smart contract systems that manage electronic stablecoins by lending them or directing them to an address, essentially performing the same tasks as fintech technologies, but in a more decentralised form as they are less tied to banks.

The growing use of DeFi and its increasing interconnectedness with traditional markets presents an urgent challenge for bankers seeking to maximise the potential effectiveness of DeFi for financial markets while managing risk (OECD, 2022). Institutionalisation of crypto assets is on the rise. The market capitalisation of stablecoins issued by the largest stablecoin issuers has been growing since 2021, increasing by nearly 500% in the last 12 months (Report of Stablecoins, 2021). The current market consists mainly of a few large stablecoins pegged to the USD. However, it has started to shrink over the past year. Between April 2022 and the end of January 2023, the total capitalisation of the stablecoin market fell by more than 25% to 138 billion USD. Much of this decline was caused by the collapse of Terra USD and the bankruptcy of major cryptocurrency exchange FTX. These events contributed to the drop in demand. Stablecoins are widely used as a bridge to facilitate trading of crypto assets. In fact, the overall market capitalisation of other crypto assets fell more sharply than that of stablecoins, resulting in an actual increase in the share of stablecoins in the overall crypto market from 9% at the beginning of April 2022 to 13% at the end of January 2023 (BIS, 2023, p. 6).

This trend reflects the growing number of asset owners seeking returns in an ultra-low interest rate environment, or entering these markets out of fear of missing out. The growing interest of institutional investors in crypto assets, combined with the heavy use of stablecoins in DeFi protocols, is also dramatically increasing the interconnectedness between traditional and decentralised financial markets. The increased use of stablecoins as collateral or as a bridge between DeFi and traditional finance could potentially increase the adoption of DeFi, although at the same time it now represents one of the most vulnerable points of the DeFi market and a potential risk transfer channel to traditional financial markets. The DeFi space has been used primarily for speculative activity. Users invest, borrow and trade crypto assets in a largely unregulated environment. The lack of controls such as know-your-customer (KYC) and anti-money laundering regulations may well be an important factor in the growth of DeFi. These trends require policymakers to rethink the traditional supervisory framework that was created with intermediaries at its core, given the lack of a single regulatory and supervisory access point to decentralised systems. Regulatory compliance with DeFi protocols may be further complicated by their global reach and use. These protocols lack a defined jurisdiction and geographic location for their application, making it difficult for supervisors to establish jurisdiction. This jurisdictional uncertainty makes enforcement difficult, especially given the speed and ease with which financial service providers can change the location of financial services in response to authorities.

The use of distributed ledger technology (DLT) (Bordo, Levin, 2017) allows anyone to be a participant and regulator in a shared network. This is embodied in the rise of cryptocurrencies and applications based on them, such as so-called decentralised finance or "DeFi".

Samuel Carstens of the BIS, speaking on international settlement, suggested that central banks could work with each other and the private sector to ensure cross-border interoperability of the various cryptocurrencies that central banks or CBDCs are expected to issue. 130 countries, representing 98 % of global GDP, are exploring a CBDC (Atlantic Council, 2023). According to the global assessment of countries' adoption of cryptocurrencies, CBDC adoption activity will increase each year, with five countries leading the way – India, Nigeria, Vietnam, USA and Ukraine (Global 2023 Cryptocurrency Adoption Index).

This will require technical interoperability, the ability of the systems to "speak each other's language", and agreement on rights and obligations. To achieve this, central banks could choose whether to build a network of bilateral links, or to create a node-based platform or a single shared platform. DLT could be used to link multiple CBDCs issued by different central banks. This would be useful as no single central bank can cover all the different currencies in the system.

The BIS Innovation Centre is developing three important projects that use the DLT platform, where several central banks issue their own wholesale CBDCs so that they can be traded between participants and enable faster, cheaper and safer cross-border settlements (Carstens, 2022).

1. A design in which each central bank exercises individual control over its own CBDCs on a single platform with separate subnetworks.
2. There is a project in which each participating central bank issues its own CBDC and operates a verification node in the common system.
3. The third project explores the advantages and disadvantages of different DLT prototypes and verification mechanisms for supporting a shared platform with multiple CBDCs.

Overall, these projects show that new technologies have significant potential if they are applied within the existing institutional structure of the monetary system. Central banks, as verification nodes, are not set up to make money from coin mining. They fulfil this role as part of their public service mandate.

While many central banks are adjusting their monetary policy strategy, some argue that the CBDC will allow a shift from inflation targeting to price level targeting (BIS, 2021). Inflation targeting is a central bank policy aimed at achieving price stability, which consists of setting a target for the inflation rate and achieving this goal through monetary policy instruments.

According to the authors of the idea, conditional CDBC transfers can facilitate the implementation of price level targeting. They argue that price level targeting will facilitate the formulation of consumption and investment plans by households and firms, since the cost of a representative basket of consumer goods, measured in terms of CBDC, will be stable in the medium term and approximately constant in the long run. The target may be nominal GDP. The central bank sets a certain level of nominal GDP as its target and uses instruments to grow the economy. For example, if economic growth is slowing, the central bank will allow more inflation to stimulate economic growth. Conversely, if the economy is overheating due to too fast economic growth, the regulator will try to slow down the rate of inflation. Targeting nominal GDP is considered by economists to be an effective policy for preventing supply shocks. It should not be forgotten that monetary policy is based on the stability of the currency used in settlements.

As the market capitalisation grows, trading in stablecoins becomes more liquid, reducing price fluctuations. Nevertheless, one of the oldest stablecoins (Tether) had an average daily price with a volatility of about 2 percentage points between the end of September 2022 and the end of September 2023. This suggests that to date, no stablecoin has been able to achieve the important prerequisite of becoming a reliable means of saving, i.e., providing a guarantee of a stable price (BIS, 2023, p. 10).

Given that the main stablecoins are backed by real fiat money, dollars, euros, Mongolian tugriks and others, which have had a high inflationary value over the past two years, stabilisation or targeting through GDP is practically impossible, as the US and EU countries are increasing public debts, with no real plans to repay them. The theoretical legacy of Milton Friedman, a Nobel Prize-winning economist from the University of Chicago, who proved 60 years ago, using the example of the Great Depression, that the dynamics of the money supply (DM) determines the dynamics of gross domestic product (GDP): if the MS grows, the economy grows, if it falls, a crisis is virtually guaranteed. Friedman's discovery turned out to be true only for countries with low inflation. But for countries with high inflation (such as the US in the 1970s), the DM should be adjusted for inflation, i.e., the real money supply should be included in the calculations. The 2008 crisis proved this once again, when the world's leading central banks, including the Federal Reserve, the Bank of Japan, the European Central Bank and the Bank of England, injected more than 25 trillion USD into the global economy through quantitative easing (QE) mechanisms since 2008. In response to the economic shock caused by COVID-19, the world's four leading central banks increased their quantitative easing programmes by a total of $9.1 trillion to support their own economies and the functioning of international financial markets (Major, 2021). GDP growth was much lower than these injections, leading to an increase in inflation, and some EU countries slipped into recession (Baltgailis, Simakhova, Buka, 2023) (Table 1, Table 2).

A comparison of Table 1 and Table 2 shows a significant increase in public debt over the past 5 years in such countries as the United States, Japan, France, and Italy. At the same time, GDP growth rates have declined significantly, and for Germany they were negative (-0.54).

At the same time, the total number of non-cash payments in the euro area in the second half of 2022 increased by 8.8% to 65.9 billion EUR compared to the previous six-month period, and the total value increased by 2.8% to 118.8 trillion EUR (Figure 1) (ECB, 2023).

In the second half of 2022, e-money payment transactions in the euro area grew by 8.2%, reaching 4.5 billion EUR compared to the previous six months. The total value also increased markedly by 12.2% to 0.3 billion EUR. Of all e-money payment transactions, 22% were made using electronic payment cards and 78% were made using e-money accounts. In terms of value distribution, electronic payment card transactions accounted for 18%, while e-money account transactions accounted for 82% (EBC, 2024).

Table 1

**Level of GDP growth (%), government debt (% of GDP) and inflation rate (%) of selected countries in 2018**

|  | USA | UK | Latvia | Germany | France | Italy | Estonia | Japan | Canada | China | Ukraine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Central government debt, total (% GDP) | 99 | 158 | 36.5 | 61 | 101.6 | 136 | 8.1 | 197.4 | 48.2 | 51.1 | 56.9 |
| Inflation Rate, % | 2.4 | 2.5 | 2.5 | 1.7 | 1.8 | 1.1 | 3.4 | 1 | 2.3 | 2.07 | 10.9 |
| GDP growth % | 2.9 | 1.3 | 4.0 | 1.0 | 1.9 | 0.9 | 3.8 | 0.6 | 3.2 | 6.7 | 3.5 |

*Source: CEIC 2023, State Statistics Service of Ukraine 2022, World Bank, 2024, Statista, 2024*

Table 2

**Level of government debt (% of GDP) and inflation rate (%) of selected countries in 2023**

|  | USA | UK | Latvia | Germany | France | Italy | Estonia | Japan | Canada | China | Ukraine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Central government debt, total (% GDP) | 123.04 | 97.4 | 44.8 | 69.3 | 113 | 151 | 18.1 | 13 | 262 | 22.7 | 71.6 |
| Inflation Rate, % | 3.1 | 4 | 0.9 | 2.9 | 3.1 | 0.84 | 4.7 | 2.9 | 2.6 | -0.8 | 4.7 |
| GDP growth % | 2.09 | 0.48 | 0.6 | -0.54 | 0.95 | 0.67 | 3.5 | 1.29 | 1.96 | 5.01 | 4.6 |

*Source: US Debt Clock2023, CEIC2023, Trading economics, 2023, Trading economics, 2024; Statisticstime, 2023, Wisevoter, 2024*
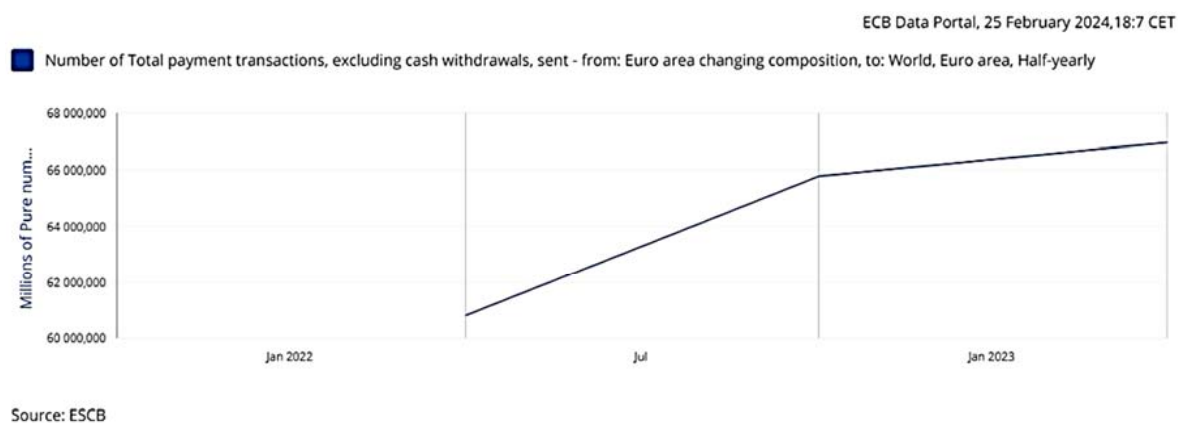


**Figure 1. Number of Total payment transactions in Euro area (EBC, 2024)**

With the emergence and spread of FinTech and DeFi technologies, as well as the introduction of CBDCs, the system of cash flow control and regulation is becoming much more complex. At the beginning of this article, the authors described how artificial intelligence can be used in the development of the banking sector. The possible instability of stablecoins and the transfer of these risks to the primary financial market, once again, relies on the existing institutional structure of the monetary system, which is determined through various settlement platforms that are being developed and implemented to expand settlement processes jointly or separately by public and private digital currencies. In this regard, the expansion of the role of central banks in the settlement system, the still unclear use of cash or CBDC electronic tokens replacing it, the maintenance of a stable exchange rate between electronic and cash money, where private digital money is processed, and the big data transnationals themselves, which are constantly increasing their assets and influence, do not give hope for the stability of the state's monetary system.

The DeFi market is growing rapidly, attracting an increasing number of retail investors and exposing them to high levels of risk. The increased interest and adoption of crypto assets by institutional investors and other traditional financial services providers is leading to an increased interconnectedness between the traditional, centralised financial system (CeFi) and the DeFi system through convergence points in areas of maximum profit. In addition, the growing use of stablecoins, tokenised and digital assets is making the boundaries between the two systems more porous and increasing the risks of spillovers to the traditional financial system and the real economy. Such risks are exacerbated by the recent price movements of major crypto assets (BTC, ETH) and the re-use of profits in the DeFi space. Digital multinationals are not constrained by the borders of the states in which they are based. For example, if Meta (Facebook) wants

Indian WhatsApp users to pay with stablecoins backed by Chinese CBDCs, who can interfere with that?

Modern capitalism is characterised primarily by the fact that rapid monetary exchange is beginning to take on an independent significance, becoming an integral and dominant part of life. Huge market structures that emerge from monetary systems (e.g., big data, FinTech or DeFi) can lose touch with the underlying communities and ecosystems that form the institutional system of a state. For example, almost two-thirds of executives surveyed by Deloitt recognise that transparency of global cash pools and risk exposures is a challenge. Similarly, 83% of respondents said they lacked visibility into currency risk, with unreliable forecasting being the biggest challenge they face in managing currency risk. Even cash flow forecasting appears to lack accuracy (Deloitt, 2024). Whether AI will be able to solve the problem of forecasting and management in the face of increasing trends towards complexity and further intertwining of cryptocurrency communities with the primary financial market, acceleration of international transactions and development of private cryptocurrency assets.

However, in such cases, the process of transition from a two-tier banking system to a single-tier system, excluding intermediaries in the form of commercial banks and private cryptocurrency developers, is actively discussed in the process of CBDC implementation (Baltgailis, Menshikov, 2023). Payment and settlement operations and cashless circulation are based on the system of interbank payments. Central bank digital currencies, as the name suggests, assume the existence of a central bank monopoly on their issuance and make it unnecessary for commercial banks to multiply the money supply.

Global big data companies may rely on their huge customer base to introduce fast and convenient cryptocurrencies to their customers, which could theoretically destabilise the current financial system and increase the risk of third-country solutions and technologies dominating the payment market. Therefore, in order to maintain its monopoly, the central bank may ban private digital currencies, as happened in China. Silvio Gesell, an early 20th-century financial reformer whose ideas had a huge impact on John Maynard Keynes and his theory of employment, interest and money, argued that the nature of money is such that its free production and circulation must be excluded, otherwise money will cease to perform its functions. In Gesell's view, the state can ignore those who start producing their own metal coins, in this case bitcoins, but the state should simply deny all these coins the right to be money, i.e., a means of payment. Gesell thinks that traditional money is only suitable for fraud (remember DeFi) and proposes to create money that loses value (Gesell, 1918).

In this case, it would be foolish to store money and it would flow into the real sector, stimulating the exchange of goods and services. Even nowadays, many central banks have started a similar experiment, releasing money supply in conditions of high inflation through QE operations. Central banks, while trying to make money cheap and available to businesses, forget that the state uses this inflationary money to solve its problems of mismanagement, plugging budget holes and distributing it among social needs in favour of political forces that make often ill-conceived promises to voters while at the same time catastrophically increasing public debt. Following on from Gesell's idea, the technology now exists to issue CBDCs with an expiration date (Bank of Canada, 2021), with China being the first to realise this idea. China is exploring expiration dates with its forthcoming digital yuan, or DCEP, which means that the currency will expire if not used within a certain timeframe (ETBFSI, 2021). The European Central Bank's attempts to incorporate bank deposits into the stabilisation rate of the digital currency can also be attributed to the same measure affecting the depreciation of money. Options to prevent their outflow after the introduction of the digital euro are being considered. Quantitative restrictions on individual deposits are considered as one of the possible instruments to avoid the use of the digital euro as a financial investment instrument. In addition, dissuasive conditions for deposits in the digital euro are also considered if they exceed a certain threshold (Vecbaštiks, Dārziņš, 2022).

And when DLT platforms are used for multiple digital currencies involved in international settlements, the central bank becomes the creator, operator and custodian of a pool of digital currencies. Central banks are very concerned about being able to convert private money (provided by commercial banks) into public or central bank money 1:1 at any time, and to use this public money to make payments. Guaranteed convertibility promotes and maintains the reliability of private and public money. This model ensures that the currency functions as a single payment system. But a wide range of means of payment in the case of parallel circulation of all kinds of means of payment: bitcoins, stablecoins, fiat money, CBDCs and their tokens, and even derivatives, can destabilise the exchange rate of public fiat money and CBDCs, as in this case the full control of the central bank will be an obstacle for many digital platforms and their customers, who are used to working without any restrictions from the state, and this with huge risks and volatility of private digital currencies. Here, one can refer to the great German philosopher Hegel, who argued that the logical should not be understood in general only in the sense of subjective activity, but rather as completely universal and, at the same time, objective, which is also true for reason, the first

form of the logical (Hegel, 2015). The universal development of artificial sociality based on AI will be able to cope with the analysis and control of a huge volume of payments in public and private currencies, otherwise, following reason and logic, the state will have to limit the expansion of private digital money, as Gesell suggests. In India, for example, the circulation of private cryptocurrencies has been banned, as stated in the official government statement, in order to create a favourable basis for the creation of an official digital currency to be issued by the Reserve Bank of India (The Guardian, 2021), while in the UK, the sale of cryptocurrency-based derivatives to retail traders will be banned from 2020, which will to some extent limit the development of the risks that caused the 2008 crisis.

In this case, the central bank will manage the retail register. As a result, a central bank server will be involved in all payments. This would require a significant technical infrastructure to provide spare capacity even during peak demand. On the other hand, the system is very resilient, as the central bank's complete information on retail account balances allows it to settle claims quickly – the information needed for verification is readily available. In this case, the work of AI is much easier, but it will be a CBDC tied to a digital identity and social credit rating, which allows the government to freeze one's assets or limit one's spending if one does not obey rules, regulations, and even arbitrary dictates (Ganowski, 2022), i.e., mandates for "another vaccination," as the famous American politician Robert Kennedy noted (Kennedy, 2023).

Global big data companies can rely on their huge customer base to introduce fast and convenient cryptocurrencies to customers, which could theoretically destabilise the current financial system and increase the risk of third-country solutions and technologies dominating the payments market. Therefore, to maintain the monopoly. The central bank may impose a ban on private digital currencies, as happened in China.

## 4. Discussion

Digital technologies are affecting almost every industry, changing not only the industry but also the way of doing business. Every industry is currently analysing opportunities and implementing strategies to succeed in this technological world.

Banks are harnessing the power of artificial intelligence in a variety of ways to revolutionise their operations and redefine the future of the industry. From fraud detection and customer service to process automation and beyond, artificial intelligence has had a significant impact on the banking industry. Here are some of the most striking examples of AI in banking.

Artificial intelligence applications play a crucial role in detecting and preventing fraud in the banking and financial sectors. AI algorithms analyse huge amounts of data to identify user behaviour, transaction history, patterns and anomalies that may indicate potential fraud. Thus, using the power of artificial intelligence, banks can detect fraudulent transactions, minimise financial losses and protect customer accounts.

In today's ever-evolving digital landscape, the rate of cybercrime has reached unprecedented heights, putting sensitive user data at risk of theft. To address this challenge, AI-powered applications have emerged as a cutting-edge tool to strengthen cybersecurity in the banking industry. AI in banking efficiently analyses past threats, learns from the patterns, detects anomalies and significantly reduces the risk of security breaches in real time. Artificial intelligence solutions provide banking institutions with a proactive defence mechanism, protecting users' data from potential cyber theft and improving the overall security networks in banks.

Artificial intelligence technologies enable banks to process large volumes of structured and unstructured data to predict market trends, gain insights and identify investment opportunities, ultimately leading to better decision-making. Data-driven decision-making helps banks increase productivity, reduce costs and stay ahead of the competition.

One of the most notable and beneficial applications of AI is the automation of repetitive and rule-based tasks. With AI in banking, organisations can efficiently automate a wide range of routine tasks such as data entry, account reconciliation, document processing, etc. This type of automation not only frees up human resources to focus on more important tasks, but also reduces the risk of errors and speeds up process completion. Furthermore, by automating tasks, AI can help banks increase profitability and reduce costs.

## 5. Conclusions

Artificial intelligence in banking is revolutionising the sector in a variety of ways, from improving customer support and fraud detection to enhancing decision-making and beyond. Banks are using AI technologies to automate operational processes, improve customer support, and mitigate potential risks, ultimately increasing efficiency and productivity.

Given the many applications and benefits of AI in banking, the future of this new technology in the banking industry seems bright indeed, with further integration between systems. As the adoption of AI in the banking and finance industry continues to grow,

it is imperative that banks harness the power of this new technology to gain a competitive edge in today's digital age. Overall, the adoption of AI in banking is significantly transforming the banking sector, making it an important tool for the growth and success of banks.

Today, every country is moving forward in terms of digitalisation, and this is the reason why the number of customers in the banking sector is constantly growing. The question now is how the banking sector can help more and more customers without increasing labour costs.

Industries face the challenge of meeting the unique demands of their customers. Customers today have extremely high expectations. Nowadays, customers are digitally savvy and expect industries to provide a pleasant and comfortable customer experience – the same as they expect from the banking sector.

To meet customer expectations, the banking sector has expanded its reach into retail, IT and telecommunications, providing services such as mobile banking, e-banking and real-time money transfers. These new features allow customers to enjoy banking services at their fingertips, but they come at a cost to the banking industry.

The interplay of IT, telecommunications and retail has increased the likelihood of confidential information being transmitted over virtual networks. This sometimes leads to cyberattacks and fraud in the banking sector. Such fraud not only damages the bank in terms of funds, but also affects people's trust.

In the banking sector, the main purpose of AI is to help consumers by prioritising their choices. AI also helps to ensure that customers are satisfied with the bank's services. AI or machine intelligence helps a bank understand customer expectations.

Hence, in order to set a clear task for AI to manage the payment system in the modern world, it is necessary, firstly, to clearly define it:

1. To identify promising levels of development of the banking system and, accordingly, to develop a strategy for the development of the national banking system, while developing the foundations and capabilities of AI-based artificial sociality.

2. Based on the strategy for the development of the national banking system, to determine the criteria for controlling and regulating the existing settlement system.

3. In addition to licensing trading platforms for digital assets, it is necessary to develop procedures for audit control of all market participants, determine the levels of risks assumed by participants in CeFi and DeFi systems, possibly by analogy with the regulation of bank reserves based on the example of BASEL I, II, III, IV, and define clear financial criteria for risks and their reserving.

4. To develop rules and procedures for connecting and disconnecting private money issuers from interstate international settlement platforms.

5. To make a final and long-term decision on cash circulation and its type (traditional form or electronic tokens).

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# References:

Atlantic Council (2023). Key findings. 2023, 06. Available at: https://www.atlanticcouncil.org/cbdctracker/

Baltgailis, J., Simakhova, A., & Buka, S. (2023). Digital currencies and FinTech innovation technologies for economic growth. *Marketing and Management of Innovations*, Vol. *14*(3), p. 202–214.

Baltgailis, J., & Menshikov, V. (2023). Digital currencies: a new banking business model. IRIS-ALKONA, 9th International Scientific Symposium "Economics, Business & Finance". Jurmala. Available at: https://5bf31921-b1d7-45e5-97d6-85c83863bfa0.filesusr.com/ugd/7ebfb0_213144bfc3fe481f9f9a11715fd53b91.pdf

Bank of Canada (2021). Expiring Central Bank Digital Currency and Loss Recovery. Bank of Canada. Available at: https://www.bankofcanada.ca/wp-content/uploads/2021/12/swp2021-67.pdf

Barrons (2024). Sweden Studies How To Save Cash From Extinction. Available at: https://www.barrons.com/news/sweden-studies-how-to-save-cash-from-extinction-5add9839

BIS (2021). BIS Working Papers No 976. Central bank digital currencies: motives, economic implications and the research frontier.

BIS (2023). BIS Papers No 141.Will the real stablecoin please stand up? By Anneke Kosse, Marc Glowka, Ilaria Mattei and Tara Rice.

BIS Annual Economic Report (2023). III 'Blueprint for the future monetary system: improving the old, enabling the new' chapter. P. 88. Available at:https://www.bis.org/publ/arpdf/ar2023e3.pdf

Biswas, S., Carson, B., Chung, V., Singh, S., & Thomas, R. (2020). AI-bank of the future: Can banks meet the AI challenge. *New York: McKinsey & Company*.

Boobier, T. (2020). *AI and the Future of Banking*. John Wiley & Sons.

Bordo, M., & Levin, A. (2017). Central bank digital currency and the future of monetary policy, *NBER Working Papers*, no 23711. National Bureau of Economic Research. Available at: https://www.nber.org>files>w23711

Burgt, J. V. D. (2020). Explainable AI in banking. *Journal of Digital Banking*, Vol. 4(4), p. 344–350.

Business Insider Intelligence (2023). Winning Strategies for AI in Banking. Available at: https://www.businessinsider.com/intelligence/winning-strategies-for-ai-in-banking

Carstens, A. (2022). Digital currencies and the soul of money. BIS. Available at: https://www.bis.org/speeches/sp220118.htm

CEIC (2023). Countries and Regions. Available at: https://www.ceicdata.com/en/countries

Deloitt (2024). Banking and capital markets outlook. Available at: https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-outlooks/banking-industry-outlook.html

CBS NEWS (2024). EU investigating Apple, Google and Meta's suspected violations of new Digital Markets Act. Available at: https://www.cbsnews.com/news/eu-apple-google-meta-investigation-new-digital-markets-act-antitrust-law/

The 2023 Global Crypto Adoption Index. Available at: https://www.chainalysis.com/blog/2023-global-crypto-adoption-index/#top20

The Guardian, 2021. Available at: https://www.theguardian.com/world/2021/nov/24/india-to-ban-private-cryptocurrencies-and-launch-official-digital-currency

ECB (2024). Payments statistics: first half and second half of 2022. Available at: https://www.ecb.europa.eu/press/pr/stats/paysec/html/ecb.pis2022~8bb6cc08f4.en.html

ETBFSI (2021). Digital Currency: Yuan comes with an expiry date: Spend or it will vanish. Available at: https://bfsi.economictimes.indiatimes.com/news/policy/digital-currency-yuan-comes-with-an-expiry-date-spend-or-it-will-vanish/82059471

Ganowski, R. (2022). CBDC: Why is a digital currency with an expiry date a very dangerous solution? Available at: https://www.amazon.com/CBDC-digital-currency-dangerous-solution/dp/B09ZC9P96X

Hegel, G. (2015). The Science of Logic. Cambridge University Press, New edition, 2015.

Gesell, S. (1918). The natural economic order. Available at: https://www.naturalmoney.org/NaturalEconomicOrder.pdf

Kennedy, R. (2023). Available at: https://twitter.com/RobertKennedyJr/status/1643658603885101073

Lukianenko, D., & Simakhova, A. (2023). Civilizational Imperative of Social Economy. *Problemy Ekorozwoju*, 18(1).

Major, J. (2021). Major central banks have printed $25 trillion since 2008, data shows. Available at: https://finbold.com/major-central-banks-have-printed-25-trillion-since-2008-data-shows/

Manuel A. Bautista-González (2022). Is There a Constitutional Right to Use Cash? Available at: https://cashessentials.org/is-there-a-constitutional-right-to-use-cash/

OECD (2022). Why Decentralised Finance (DeFi) Matters and the Policy Implications. Paris. Available at: https://www.oecd.org/daf/fin/financial-markets/Why-Decentralised-Finance-DeFi-Matters-and-the-Policy-Implications.pdf

Rahman, M., Ming, T. H., Baigh, T. A., & Sarker, M. (2023). Adoption of artificial intelligence in banking services: an empirical analysis. *International Journal of Emerging Markets*, Vol. 18(10), p. 4270–4300.

Report of Stablecoins (2021). President's Working Group on Financial Markets the Federal Deposit Insurance corporation and the Office of the Comptroller of the Currency. P 7. Available at: https://home.treasury.gov/system/files/136/StableCoinReport_Nov1_508.pdf

The State Statistics Service of Ukraine (2022). *Statistical Yearbook of Ukraine in 2021*. Kyiv. Available at: https://www.ukrstat.gov.ua/druk/publicat/kat_u/2022/zb/11/Yearbook_21_e.pdf

Statista (2024). China: National Debt from 2018 to 2028. Available at: https://www.statista.com/statistics/531423/national-debt-of-china/

Statisticstime (2023). Projected GDP Ranking. Available at: https://statisticstimes.com/economy/projected-world-gdp-ranking.php#google_vignette

Trading economics (2023). *USA indicators*. Available at: https://tradingeconomics.com/united-states/indicators

Trading economics (2024). Inflation rate by country. Available at: https://tradingeconomics.com/country-list/inflation-rate-US debt clock (2023). Available at: https://www.usdebtclock.org/

Vecbaštiks, R., & Dārziņš, E. (2022). Digital euro – how much have we achieved? Bank of Latvia. Available at: https://www.bank.lv/en/component/content/article/682-news-and-events/publications/articles/13083-digital-euro-how-much-have-we-achieved

Wisevoter (2024). Debt to GDP ratio by country. Available at: https://wisevoter.com/country-rankings/debt-to-gdp-ratio-by-country/

The World Bank (2024), GDP Growth. Available at: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=CN