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INNOVATION IN BANKING SERVICES AMID THE RISE OF THE DIGITAL ECONOMY: STRATEGIC APPROACHES AND GLOBAL TRENDS

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ANNOTATION: The article explores the transformative impact of digital technologies on the banking sector within the evolving digital economy. It examines strategic approaches adopted by banks, such as Banking-as-a-Platform and open banking, to enhance efficiency and customer engagement. The study highlights the integration of artificial intelligence, machine learning, big data analytics and blockchain in banking operations, emphasizing their roles in fraud detection, personalized services and operational optimization. It also discusses the emergence of fintech collaborations, regulatory frameworks like PSD2 and the shift towards digital-only banking models. The article underscores the necessity for traditional banks to embrace digital transformation to remain competitive and meet the evolving expectations of digitally savvy customers.

Keywords: Digital Banking, Fintech, Artificial Intelligence, Open Banking, Big Data, Blockchain, Banking-as-a-Platform, Digital Transformation

ANNOTATSIYA. Ushbu maqolada raqamli texnologiyalarning rivojlanib borayotgan raqamli iqtisodiyot sharoitida bank sohasiga ko‘rsatgan transformatsion ta’siri o‘rganiladi. Unda banklar tomonidan samaradorlikni oshirish va mijozlar bilan aloqalarni mustahkamlash maqsadida qo‘llanilayotgan strategik yondashuvlar, jumladan, platforma sifatidagi bank (Banking-as-a-Platform) va ochiq bank (open banking) tushunchalari tahlil qilinadi. Tadqiqotda sun’iy intellekt, mashinaviy o‘rganish, katta ma’lumotlar tahlili va blokcheyn texnologiyalarining bank amaliyotlariga integratsiyasi, ularning firibgarlikni aniqlash, shaxsiylashtirilgan xizmatlar ko‘rsatish hamda operatsion jarayonlarni optimallashtirishdagi o‘rni yoritilgan. Shuningdek, fintech bilan hamkorliklarning paydo bo‘lishi, PSD2 kabi me’yoriy-huquqiy hujjatlar va raqamli bank modellari tomon yo‘nalish muhokama qilinadi. Maqolada an’anaviy banklar raqamli transformatsiyani qabul qilishlari zarurligi, bu orqali raqobatbardosh bo‘lish va raqamli texnologiyalarni yaxshi biladigan mijozlarning o‘zgarib borayotgan talablariga javob berish imkoniyati yaratilishi ta’kidlanadi.

Kalit so‘zlar: Raqamli bank, Fintech, Sun’iy intellekt, Ochiq bank (open banking), Katta ma’lumotlar, Blokcheyn, Platforma sifatida bank (Banking-as-a-Platform), Raqamli transformatsiya.

Introduction. In the 21st century, the banking sector stands at the forefront of a technological revolution driven by the rise of the digital economy. As digital technologies continue to transform every aspect of economic activity, banks are compelled to adapt rapidly to evolving customer expectations, increased competition from fintech companies and shifts in global financial ecosystems. The convergence of innovations such as artificial intelligence (AI), big data analytics, blockchain and mobile platforms is reshaping traditional banking operations and redefining the customer experience.

By analyzing the integration of advanced technologies and collaborative models, this study aims to offer a comprehensive understanding of the transformative trends in digital banking. It also highlights the challenges and opportunities facing traditional banks as they navigate the transition toward digitally enabled financial services. Ultimately, this research underscores the critical importance of innovation and strategic alignment in shaping the future of global banking in the digital age.

Methodology. This study adopts a qualitative research approach, grounded in a comprehensive analysis of existing literature, case studies and industry reports to explore the impact of digital innovation on banking services. Secondary data has been collected from academic journals, papers, market research publications, regulatory documents and credible news sources related to digital banking, fintech developments and global financial trends.

Case examples from global banking institutions and fintech collaborations have been integrated to provide practical insights and comparative analysis. This methodological framework enables a multi-dimensional understanding of how banks are innovating their services in response to digital economic trends.

By synthesizing diverse sources and identifying key themes, the study presents an informed narrative of the current state and future direction of digital transformation in banking.

Results and Discussion. In recent years, digital technologies like machine learning, the Internet of Things, big data and blockchain have caused big changes in many industries around the world. These changes have encouraged researchers to create new approaches to manage innovation. One of these new ideas is called the “digital innovation ecosystem” which shows how different elements work together to help these systems grow and develop .This trend includes many different people and organizations, and big data and analytics play a key role. These tools are seen as powerful and game-changing for innovation. They bring many benefits to the economy and have led to large investments in data skills and technologies.

As this digital world grows, the banking sector also has to change. Banks are being pushed to update their business models, focus more on digital tools and improve how they interact with customers (Bank for International Settlements, 2018). This change is happening naturally because of the rise of financial technology, however it is also being encouraged by governments through the EU’s digital plan. In some countries like China and the US, open banking is growing due to market demandwhile in places like the EU, it is driven by rules and policies(Stefanelli et al., n.d., p. 1).

In recent years, guidance and support from central authorities (Bank for International Settlements, 2019) have helped push digital changes in the financial sector which is one of the most affected industries. Traditional banks are now working hard to update their business models. They are doing this not only to improve efficiency and make more profit but also to take advantage of the new opportunities offered by digital technologies. One major change is the move towards a new model called "Banking-as-a-Platform" which opens the door to more sustainable and appealing business options for banks. These updates are also important because customer needs are changing that people are becoming more digital and expect faster, easier services (Financial Stability Board, 2019; Bank for International Settlements, 2020; Bank of Italy, 2021)(Stefanelli et al., n.d., p. 2).

Part of these changes comes from new rules like the PSD2 law about digital payments. This law helps manage who can enter the European payments market and ensures better safety and transparency for users (Associazione Bancaria Italiana, 2020). PSD2 also allows new companies called Fintechs to join the market. These companies often rely on technology to offer new or improved financial services. They are quick, flexible and good at using large amounts of data.

Since many are start-ups, they follow different rules compared to regular banks which must meet stricter standards. Fintechs are especially active in the payment services area but are also making an impact across the whole financial sector. The progress and success of the Fintech industry vary by country (International Monetary Fund, 2019).

Because of all this, banks need to rethink their strategies and how they are organizedor they risk falling behind. No matter what strategy a bank chooses going digital is now necessary (Omarini, 2018; Anand & Mantrala, 2019; Khanboubi & Boulmakoul, 2019; Ayadi et al., 2021; Appio et al., 2021). According to a report by the Italian Banking Association (ABI - 2022), banks are changing how they deliver services. They are reducing physical bank branches increasing services at ATMs, offering more ways for customers to interact, providing more payment devices and processing more electronic transactions (European Commission, 2015; European Banking Authority, 2018)(Stefanelli et al., n.d., p. 2).

Researchers say that these changes are more successful when banks work with Fintech companies and hire digital experts. The COVID-19 pandemic sped up this shift by limiting in-person banking and encouraging more people to use digital and mobile banking.

Some studies suggest that Fintechs can be valuable partners for banks. Working together can help banks offer better products and services. This approach called open banking allows banks to share data with Fintechs or big tech companies (like Google, Amazon, Facebook, etc.) and offer customers added value. These services are delivered through shared platforms that use standardized software connections, known as APIs (Application Programming Interfaces)(Stefanelli et al., n.d., p. 2).

Over the past 20 years, the idea of "ecosystems" has gained attention in business studies and real-world business practices. In finance, this includes digital ecosystems especially those using financial technology or Fintech. These new technologies can disrupt traditional industries and change how they work. Banks and financial institutions are especially affected because they connect people and companies by offering services like payments, loans and trading. As competition increases, these organizations must find faster and cheaper ways to serve customers often by using new business models. Banks also play a big role in helping the economy transition to greener and more digital solutions.

Fintech has grown quickly changing how banking, payments, investments and even money itself work. The Fintech ecosystem includes both traditional companies (like banks and insurance firms) and new companies (like startups) offering fresh ideas and business methods. One way to build such an ecosystem is by using APIs (tools that let different software programs talk to each other).

Even though Fintech is growing fast, it still holds only a small part of the overall financial market. Most Fintech growth is seen in the US and China while Europe, especially the UK, follows behind. Fintech companies often focus on areas like insurance, loans, online payments, investment services and financial advice. They can reduce costs and help more people get access to financial services that traditional banks may not offer.

Another important issue for banks is handling Big Data. Financial institutions are changing to use more data and open banking systems which connect different services and make banking more flexible. Disruptive technologies can improve how efficiently banks work and how well they meet customers' needs. As a result, banks are moving toward platforms that focus on customers and are managed using APIs. Traditional banks need to reduce the cost of physical branches and improve services to compete with newer digital players.

Whether Fintech is seen as a threat or an opportunity depends on how banks respond. If they

choose to partner with Fintech companies, both sides can benefit. Traditional banks could lose a large portion of their profits (up to 35%) if they do not adapt. However if they start digital transformation early, they can keep their strong position or even grow. Because of this, working with Fintech companies has become very important. Financial supervisors, like the European Central Bank, have made digital transformation and cybersecurity top priorities for the coming years(Stefanelli et al., n.d., p. 4).

A study by Accenture with senior managers from major banks found that banks must focus on three key areas for successful digital change: openness, collaboration and investment. "Openness" means being willing to use external technologies and systems. This is common in the Fintech world where banks use APIs to connect external tools with their own services and offer new useful features.

A 2017 Ernst & Young report says that both banks and Fintech firms can benefit from partnerships as long as they are well-managed. To do this, banks should simplify their operations and use external platforms and services when it is possible. This leads to more innovation and efficiency through a system built like building blocks that work together(Stefanelli et al., n.d., p. 4).

Under rules like PSD2, banks should offer services through an open platform, such as financial management tools that combine multiple accounts and compare fees and rates. Many banks are moving towards becoming digital platforms with fewer physical branches.

Some banks are even hiring experts from tech hubs like Silicon Valley to bring in modern tools and services. Research from Iran also shows that using digital banking tools like mobile apps and ATMs can boost a bank's profits and market share.

"Open innovation" in banking involves using ideas and technologies from outside the bank. There are two main approaches: **outbound** (sharing innovations with the outside) and **inbound** (bringing in external knowledge). With regulations like PSD2, banks have had to change their business models and start partnering with digital finance companies(Stefanelli et al., n.d., p. 5).

In Russia, for example, traditional banks prefer to build their own Fintech services by working with other players in the ecosystem(Stefanelli et al., n.d., p. 5). However, they mostly use new technologies like AI to lower costs rather than to create new services.

Banks face several big challenges:

1. Deciding whether to build their own Fintech tools or invest in startups;
2. Meeting the needs of increasingly digital-savvy customers;
3. Dealing with complex and expensive regulations;
4. Updating old technology systems;
5. Keeping customer data safe.

Many banks prefer to buy ready-made Fintech solutions and use them under their own brand to save time. Others choose to host these services internally or use them through cloud-based systems especially smaller companies. The financial world is becoming more competitive and flexible giving customers more choices

Artificial Intelligence (AI) and Machine Learning (ML) are two powerful technologies that have changed many industries, including finance, healthcare and retail.

AI means creating machines or computer programs that can think and learn like humans. It covers many tasks such as recognizing images, understanding speech, making decisions and understanding language.

AI is divided into two types:

- **Narrow AI (Weak AI):** This type of AI is designed for specific tasks. For example, voice assistants like Siri or Alexa, recommendation systems and face recognition apps.

- **General AI (Strong AI):** This type of AI would be able to do any task a human can do. However, it does not exist yet and is still a theoretical idea.

Machine Learning is a part of AI that allows computers to learn from data without being directly programmed. Instead of following fixed instructions, ML systems learn by analyzing data and improving over time.

Types of ML include:

- **Supervised Learning:** The system learns from labeled data (data with correct answers) to make predictions.

- **Unsupervised Learning:** The system finds patterns in data without any labels or instructions.

- **Reinforcement Learning:** The system learns by interacting with an environment and getting rewards or penalties like in games(Kumar, 2024, pp. 60-61).

AI and ML are changing the way companies work. They help automate tasks, improve decision-making and offer personalized services to customers. These technologies are used in self-driving cars, medical tools and stock trading making work faster and more accurate.

In the financial world, AI and ML help banks and other institutions handle massive amounts of data quickly and accurately. They can:

- Detect fraud in real time

- Improve investment strategies

- Predict market trends

- Help manage risks

They also make everyday tasks like customer service easier allowing workers to focus on bigger goals. This helps financial companies save money and offer services more quickly.

AI also includes other technologies such as:

- **Natural Language Processing (NLP)** – helping computers understand human language

- **Computer Vision** – allowing machines to "see" and understand images

- **Robotics** – machines that can move and act physically

AI and ML make interactions with machines smarter. Different industries are adopting these technologies at different speeds. The financial sector has been one of the first to invest heavily in AI and ML gaining many benefits. These include:

- Better customer experience
- More efficient operations
- Easier rule-following
- Smarter decisions
- Faster development of new products

Technology is changing how society, the economy and banks work. Banking used to happen mostly in physical branches, but now it has moved to ATMs, phones, internet and mobile apps. This change continues with new technologies like cloud computing and big data becoming important. Cryptocurrencies are also becoming part of everyday life. Digital communication lets us connect with people worldwide easily.

In the past, banks were mainly buildings where customers had to visit, often causing long lines and delays. As this was inconvenient, banks started to create new, technology-based services to make things easier for customers.

Traditional banking included:

- In-person help from bank staff inside buildings
- Lots of paper forms and documents
- Waiting in lines

However, the world is changing and technology makes banking more convenient. Today people can do most banking tasks remotely using smartphones or computers without leaving home.

Digital banking means doing banking activities through technology like the internet, mobile phones, ATMs and other digital channels. It is usually cheaper, faster and has fewer mistakes than traditional banking. Because of this, customers get better service and more affordable products. Digital banking is part of the wider digital transformation happening globally. As more people use the internet and social media, customers expect faster, better and cheaper digital services.

Digital banks are growing quickly, especially in places like the UK and the EU. Examples are Monzo, Starling Bank and Revolut. These banks operate only digitally and focus on personalizing services based on customer feedback. A study showed that about 28% of people in the UK want to use digital banking and worldwide, the number is around 35%. However, some people still prefer traditional banks. In Europe, you can open a bank account easily using your phone while some countries like Turkey still rely on traditional methods like signatures and physical ID checks(Bakoeva, 2025, p. 14).

Digital Banking Trends in 2024

New technologies like AI assistants, mobile apps and self-driving machines are changing how banks serve customers. Banks need to use innovation to meet customers' needs for security, privacy and ease of use.

Some important technologies modern banks use include:

- **APIs (Application Programming Interfaces):** These let different software and apps communicate with each other. This helps banks connect their services internally and with other

companies, allowing real-time interaction.

- **Cloud Computing:**

Banks face competition from fintech and tech companies, so they need to be flexible. Cloud services from providers like Microsoft Azure or Google Cloud help banks store data and use computing power over the internet, making it easier to innovate and grow.

- **Internet of Things (IoT):**

IoT connects gadgets to provide real-time data, making customer experiences more personal. It also enables fast cashless payments and adds security features like biometric sensors. IoT helps banks reduce risks and improve access across different platforms.

- **Big Data Analytics:**

Banks handle massive amounts of data from millions of customers. By analyzing this datafrom online payments, ATM use, e-banking, IoT devices, to customer identity checks that they can understand what customers want and offer personalized services. Banks that use data well to tailor their offers will succeed in the digital banking world(Bakoeva, 2025, pp. 15-16).

In today's very competitive digital world, Artificial Intelligence (AI) and Machine Learning (ML) have become a core part of the finance industry. They help with important tasks like making decisions and delivering services to customers.

Here are some key areas where AI and ML are widely used in finance:

- **Risk Management:** AI and ML analyze past data, market trends and outside factors in real time to predict and manage risks, helping banks keep their investments safe.

- **Fraud Detection and Prevention:** AI systems watch transactions and customer behavior to spot and stop fraud quickly, protecting both banks and customers.

- **Algorithmic Trading:** AI-driven programs automatically buy and sell stocks based on data like past prices, news and market signals, making trading faster and smarter.

- **Credit Rating and Lending:** AI helps predict if a customer can repay a loan by looking at lots of data like credit history, income and banking records. This helps banks give better loan offers.

- **Investment Management:** AI studies market trends and asset performance to give personalized investment advice and help manage money according to individual goals and risk levels.

- **Compliance Management:** AI automates checking transactions for rule-breaking and helps banks stay within regulations, reducing risks and making reporting easier.

- **Quantitative Analysis and Forecasting:** AI uses historical data to analyze financial markets and predict trends, helping investors make informed decisions.

- **Insurance Underwriting and Claims:** AI speeds up risk assessment and claim processing, detects fraudulent claims and improves accuracy, making the process faster and better for customers(Kumar, 2024, pp. 62-63).

In conclusion, the rapid evolution of the digital economy has significantly reshaped the global banking landscape, compelling financial institutions to adopt innovative strategies and cutting-

edge technologies to remain relevant and competitive. This study has shown that digital transformation in banking is not merely an option, but a strategic imperative driven by changing customer behaviors, heightened competition and the proliferation of digital-native financial services.

The integration of advanced technologies such as artificial intelligence (AI), machine learning (ML), big data analytics and blockchain is revolutionizing banking operations by enabling real-time decision-making, enhancing security through advanced fraud detection and delivering hyper-personalized customer experiences. Concepts like Banking-as-a-Platform (BaaP) and open banking have opened up new business models, encouraging collaboration between traditional banks and fintech startups while fostering innovation and expanding customer choice.

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