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THE ACCELERATED RISE OF ARTIFICIAL INTELLIGENCE IN THE BANKING SECTOR IN CONDITIONS OF GLOBAL INSTABILITY

Abstract: Artificial Intelligence (AI) is rapidly moving from experimental to operational implementation and is becoming a key tool for transforming the banking industry, as a standard that is changing the lending process, risk management, customer relationships, user experience, fraud detection, customer churn prevention and decision-making process. Banks that use AI wisely are becoming industry leaders, providing faster, smarter and more personalized services to customers, while automating business processes. The aim of the paper is to comprehensively explore and highlight the application opportunities that AI brings to the banking sector, how banks scale AI solutions with technological, investment and regulatory implications, and to contribute to the understanding of the role that AI plays in the banking industry by focusing on its application, implementation, challenges and potential benefits for stimulating innovation and competition, through the example of global leading banks and the accelerated rise of AI in the banking sector of the Republic of Serbia. The subject of research in this paper is the accelerated development of AI in banking in conditions of global instability and market volatility, where the introduction of AI imposes the need for resilience, smart and rapid adaptation, talent development and responsible innovation in order to create additional value in the market. The research methodology is based on a combination of analysis of scientific and professional literature, analysis of relevant reports from regulatory institutions, banks and consulting firms, as well as a comparative analysis of the maturity level of AI implementation in the banking sector of developed countries and the Republic of Serbia. The research results indicate that the key to AI implementation lies in the smart use of technologies, compliance with regulatory requirements, transparency and ethical principles in data management, where the best practices of leading global banks provide a framework for how AI is used to increase efficiency, stimulate innovation, develop talent and compete in the banking sector. The paper provides theoretical and practical implications for understanding and implementing AI in the banking sector, where from a practical point of view it provides significant guidance to top managers and bank owners for implementing AI in a selected business model, where the assessment of the maturity of AI implementation compared to market leaders provides recommendations, promotes transparency and trust in the implementation of AI. Ethics, data quality and transparency are key to trust, and banks that implement AI in accordance with these principles will be the ones that progress the fastest. The proposal for future research primarily relates to the analysis of potential risks and challenges of implementing AI in terms of stability and cybersecurity, which is also a limitation of this research, which is primarily oriented towards the positive aspects and the implementation of best practices of AI in the banking sector.

Keywords: Artificial Intelligence (AI); digital transformation; banking sector; innovations, protection.

1. INTRODUCTION

The application of artificial intelligence (hereinafter referred to as AI) is one of the most current topics in modern banking. Clients in digital business conditions have increasing expectations, competition is increasingly innovative, and banks are increasingly investing in innovation-driven transformation, where the level of maturity of AI application determines the market position, which also represents an opportunity for further development of the banking industry. By using advanced technology, banks can optimize business functions and processes, reduce costs and provide better service to customers, where the application of AI becomes a key “grail” of digital transformation, changing the banking landscape with a holistic approach to the customer.

The aim of the paper is to explore and highlight the application opportunities that AI brings to the banking sector, with a focus on its application, implementation, challenges and potential benefits for stimulating innovation and competition, through the example of global leading banks in developed markets, but also the accelerated rise of AI in the banking sector of the Republic of Serbia. The key research questions in the paper relate to the role of AI applied in the banking sector; what are the key technologies for applying AI in banking; what are the key development strategies and top management decisions in implementing AI in banks; the level of maturity of AI application and which banks are the most advanced in applying AI; how AI affects bank performance with a presentation of leading global banks that are market leaders in AI implementation and how they are actively adapting their people, policies and processes, what lessons they have learned and what best practices they have adopted to accelerate innovation and increase competitiveness; as well as the accelerated rise of AI in the banking sector of the Republic of Serbia. Also, the paper should answer whether the “new” bank, which is adaptable, innovative, with a personalized/holistic approach to the client, will create a digital leader that will meet the needs of new generations and become a bank that represents a combination of technology, responsible regulation and lasting trust in times of rapid change and uncertainty.

The research methodology is based on a combination of analysis of scientific and professional literature, analysis of relevant reports of regulatory institutions, banks and consulting firms, as well as a comparative analysis of the degree of maturity of the application of artificial intelligence in the banking sector. In the first part of the research, a literature review will be conducted to identify key areas of AI application in banking, including credit scoring, risk management, fraud detection, process automation, customer support and personalization of banking services. Special attention will be paid to the challenges of AI implementation, such as regulatory requirements, data protection, ethical issues, transparency of algorithms and the need to develop employees' digital competencies. The empirical part of the paper will use the content analysis of publicly available business reports of banks, announcements of the National Bank of Serbia, strategic documents and relevant international reports on the application of AI in the financial sector. As an additional analytical framework, the Evident AI Index will be used, which measures the maturity of banks in the application of AI through four dimensions: talent, innovation, leadership and transparency. Based on this index, the practice of leading global banks will be presented, and then compared with the available data on banks in the Republic of Serbia.

2. ARTIFICIAL INTELLIGENCE IN BANKING – LITERATURE REVIEW

AI applications are a broad field of computer science that focuses on creating models capable of performing tasks that typically require human intelligence, such as natural language understanding, image recognition, decision-making, and learning from data. These tasks involve complex problem-solving and human-like decision-making, which has been a subject of interest to researchers for more than seven decades (Agrawal et al., 2019; Furman and Seamans, 2019; Brynjolfsson et al., 2021). In addition, the past few years have seen a significant increase in the practical application of AI in various industries, such as finance, healthcare, and manufacturing, thanks to advances in computing power, data storage, and low-latency, high-bandwidth communication protocols (Biallas and O'Neill, 2020). The reason for the widespread adoption of AI in sectors such as financial services is its versatility (Milana and Ashta, 2021). A survey by the Bank of England and the FCA (Financial Conduct Authority) found that 80% of banks surveyed reported using or developing machine learning and AI applications (Blake et al., 2022). The increased use of AI in banking can be partly attributed to intense competition within the sector (Kruse et al., 2019). The banking industry generates a huge and ever-growing amount of data, including daily transactions, market trends, and customer information. Such rich data can be used to control AI algorithms and create predictive models, making it an ideal domain for AI applications (Boot et al., 2021). These applications can identify patterns and predict future market trends, enabling banks to make better decisions about investments and other business operations. AI can also analyze customer behavior and preferences, offering tailored recommendations and personalized services (Zheng et al., 2019). Despite all the benefits of AI in the banking sector, industry experts and academic research suggest that financial institutions have not been able to fully exploit the potential of AI (Fabri et al., 2022). Empirical evidence on its impact on bank performance and risk also provides mixed results. This is partly due to the numerous challenges and barriers to using AI models. One of the main concerns of clients is the issue of data bias and transparency, as improper use of AI can lead to discriminatory decisions (Ashta and Herrmann, 2021).

As AI becomes increasingly popular in the banking sector, banks are facing challenges related to the explainability and interpretability of AI models, which require transparency and accountability in decision-making processes (Fabri et al., 2022). Lack of interpretability can make it difficult for banks to identify and correct errors or biases in their decision-making mechanisms using AI, resulting in legal and financial consequences. Therefore, explainability and interpretability are key factors for the responsible and ethical use of artificial intelligence in the banking sector (Fabri et al., 2022). Such challenges arising from the application of AI in banking highlight the importance of effective model governance and regulation to ensure the ethical and responsible use of AI (Ryll et al., 2020). Such measures not only increase customer trust in AI, but also help banks avoid negative consequences such as legal liability, reputational risk, and customer loss/attrition. By using AI, banks can gain a competitive advantage by introducing innovative services and improving operational efficiency (Ryll et al., 2020). However, strict regulations can impose significant burdens on bankers who want to implement AI systems, including additional costs related to data privacy, security measures, or hiring more people to monitor and maintain the technology. These costs can cause banks with limited resources to reduce their allocation to AI development, which will affect their competitiveness and find other business models through cooperation with fintech companies or M&A processes. Regulators must balance the benefits and risks of AI and ensure that appropriate safeguards are in place to mitigate negative outcomes. For example, the LSE has partnered with IBM Watson and SparkCognition to develop AI-enhanced supervisory capabilities, while FINRA is using AI to identify and prevent stock market abuse (Prove., 2021). A recent surge in publications has shed light on the various opportunities, challenges, and implications of AI in the banking industry (Bahrammirzaee, 2010; Königstorfer and Thalmann, 2020), and most empirical studies indicate a positive correlation between AI adoption and profitability, implying that banks are actively investing in AI technologies.

The banking sector has transformed at an unprecedented pace in the last 5 years. It all started as a response to surviving the pandemic, but then progressed to a complete reinvention of the way banks operate, communicate with customers and grow. The most significant changes in the period 2020-2026, according to the Bank of England in Summary of AI roundtables, 2026, are reflected in the adoption of digital banking services by all age groups and the adoption of a cloud-first strategy, where by 2023, 74% of banks followed the example of Capital One from the US market. By 2022, banks are like technology companies, where the focus is on platform thinking, applications and BaaS (banking as a service) allow third-party companies to access banking services via APIs. Notable examples of BaaS are all fintech companies like Stripe, Revolut, N26, and BBVA Open Platform, where cybersecurity has become a competitive advantage, unlike before, when it was just a compliance task, and sustainability has moved from an idea to a global implementation. 2023 has become a year of deep thinking about what customers really want and where banks have responded with hybrid user experiences. Banks have provided a way to seamlessly interact between apps, branches, or video calls with consultants, empowering their customers to practically manage their finances. In 2024, compliance has expanded from “check-the-box” activities like AML or KYC to AI ethics, data privacy, and ESG disclosure. AI in 2025 is becoming the core where generative AI powers personalized user experiences, advanced analytics, and increases operational efficiency in the banking sector. AI in 2026 shifts the focus to AI agents that act autonomously to complete tasks, optimize workflows, and guide customers through building a positive user experience.

3. KEY ADVANCED TECHNOLOGIES AND ACCELERATED APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE BANKING SECTOR

The application of AI is fundamentally restructuring the DNA of the banking industry and, according to McKinsey&Company's 2024 study, Extracting value from AI in banking, is already witnessing a shift from experimental AI to operational AI, where generative AI models create content and personalize communication, and proactive agent-based AI models take on the role of executors who independently complete processes. According to Deloitte's 2024 study, Changing the game. The impact of AI on the banking and capital markets sector, AI in banking refers to the use of key advanced technologies such as: machine learning, natural language processing (NLP), predictive analytics and robotic process automation (RPA). Also, according to Deloitte's 2021 study, Artificial Intelligence: Transforming the Future of Banking, the main categories of AI applications in banking, according to the areas of banking operations, are as follows: Customer Interaction (Front Office): chatbots and virtual assistants, offer personalization, biometric authentication; Risk and Security Management (Middle Office): Fraud Detection, Credit Scoring, Anti-Money Laundering (AML); Operational Efficiency (Back Office): Process Automation (RPA), Analytical Forecasting, Investment Banking, Algorithmic Trading with Split-Second Order Execution Based on Market Signals, and Robo-Advisors. The most common AI application cases in banking are as follows:

1. Fraud Detection and Anti-Money Laundering (AML) where AI analyzes transaction history, location, and behavior to detect suspicious activity in real time. According to Kellton, AI in Banking: Use Cases, Benefits, and the Future of Finance, AI/ML, 2026, JPMorgan Chase reported a 20% reduction in account validation rejection rates thanks to AI-powered payment verification that uses generative adversarial networks (GANs),

multimodal analysis (facial biometrics, keystroke patterns, mouse movements) in real time to simulate and stay ahead of sophisticated identity theft attempts. Automation of the Know Your Customer (KYC) and Anti-Money Laundering (AML) processes reduces manual labor by up to 70%, according to Kellton, AI in Banking: Use Cases, Benefits, and the Future of Finance, AI/ML, 2026.

2. Generative AI that has transformed clumsy chatbots into sophisticated virtual assistants that summarize bank statements, explain loan terms, and help customers create a budget. Modern AI uses AI agents that can autonomously perform tasks such as collecting missing loan documents or initiating background actions with a 98% success rate without human intervention, according to Kellton, AI in Banking: Use Cases, Benefits, and the Future of Finance, AI/ML, 2026.
3. Hyper-personalization - Banks today have access to vast amounts of data where AI allows them to move from segmentation (grouping people by age) to individualization. If AI notices that a customer is researching flights to Europe, the bank can immediately offer a discount on travel insurance or a credit card with no foreign transaction fees. Real-time sentiment analysis now allows banks to instantly adjust offers during live chats, resulting in a better user experience.
4. Smart Credit Scoring - Traditional credit scoring often ignores loan applicants without a credit history. AI models can analyze alternative data such as utility bill payments, rent, and even fingerprints to assess creditworthiness. This promotes financial inclusion while reducing the risk of default. According to Kellton's research, AI in Banking: Use Cases, Benefits, and the Future of Finance, AI/ML, 2026, advanced machine learning models have improved loan approval accuracy by 30%, allowing banks to safely approve loans to millions of previously underserved individuals.
5. Automated underwriting and document processing - Banks are using AI for documents to instantly extract data from tax returns in order to shorten the loan execution time. Intelligent Document Recognition (IDR) has reduced the time it takes to write and summarize documents by 50%, enabling instant lending protocols at most banks. The transition to agent-based underwriting in 2026 enables 99% code accuracy according to specifications in complex credit applications, freeing up employees to focus solely on risk negotiations, credit details, and repayment capacity, according to Kellton, AI in Banking: Use Cases, Benefits, and the Future of Finance, AI/ML, 2026.

According to the KPMG report: Alliance or obsolescence: How banks can win with an AI-driven ecosystem from 2026, 88% of financial institutions have integrated AI into at least one key business function, signaling near-full market penetration, while the global AI market in banking grew to an estimated \$45.59 billion in 2026. Also, according to the same KPMG report, it is projected that the application of generative AI in the banking sector will lead to productivity improvements of up to 6% in banking operations by 2030, significantly reducing the cost-to-income ratio.

According to the 2025 E&Y Parthenon Retail and Commercial Banking Generative AI Survey, 80% of banks have implemented or gradually launched generative AI capabilities, with 61% already seeing strong impacts and 89% seeing strong impacts in the next two years; 99% of banks are familiar with agent-based AI, however only 31% have pursued implementation, and an additional 46% are interested in the technology; the identification of AI use cases is balanced between front-office, middle-office and back-office, with front-office leading the way in implementation. Also according to the same E&Y survey, banks cited data challenges as the biggest barrier to successful implementation, while 22% of banks had concerns about data privacy, and an additional 21% had limited access to high-quality data.

By moving from reactive to proactive AI services and their applications in banking, banks are insulating themselves from market volatility and setting new global standards for transparency and speed. According to the E&Y, Parthenon Retail and Commercial Banking Generative AI banking 2025 study, the main benefits of implementing AI are reflected in: operational efficiency and cost reduction, 24/7 availability, improved risk management and improved employee productivity, where AI becomes the so-called "co-pilot" for bank managers, providing real-time insights and suggesting the "next best action" during meetings with clients. This synergy of humans and AI saves time, allowing bankers to focus on building deeper, more empathetic relationships that machines cannot replace.

4. DEVELOPMENT STRATEGIES, IMPLEMENTATION AND RISKS OF ARTIFICIAL INTELLIGENCE IN BANKING

Successful AI is impossible without a thoughtful, leadership-backed strategic framework that prioritizes quality over quantity. The main challenge for bankers is well-known: translating bold strategies into measurable progress. According to a 2024 study by Buehler et al. for McKinsey & Company, banks must make seven key decisions to successfully scale GenAI, including choosing an operating model, data architecture, talent management, and establishing security controls. A focus on prioritizing use cases, scaling strategy, and business case is essential to moving from pilots to full implementation. According to Buehler et al., 2024, the key decisions are:

- Strategy and Vision – defining the genAI development strategy at the organization-wide or specific business unit level.
- Domains and Use Cases – deciding who defines the organization’s business domains for genAI deployment and the specific use cases within those domains.
- Implementation model – decide whether to procure targeted solutions from vendors, design or integrate broader, more comprehensive solutions, or develop in-house solutions.
- Funding – banks typically fund use cases through a combination of individual business units and a central team dedicated to building a foundation for gen AI development.
- Talent – define the skills required for successful gen AI implementation, and secure the necessary talent through hiring, training, outsourcing, or a combination of these strategies.
- Risk – determine who defines risk protection measures (e.g., data privacy, intellectual property infringement) and risk mitigation strategies.
- Change Management – form a team to lead the change management process to ensure the necessary changes in mindset and behavior, in order to successfully adopt genVI throughout the organization.

To choose the operating model that works best, banks need to set clear expectations for AI implementation and build flexibility into the model so that it can adapt and improve over time, both in terms of organization and funding due to the impact on banking performance. On this path, banks face several critical challenges, according to the Caplan Artificial AI strategy for banks in Bosnia and Herzegovina, Serbia and Croatia Guide to digital transformation from 2026, such as: talent shortages and competition from IT companies, integrating AI with existing banking systems that are often decades old, data quality, employee fear of job loss and resistance to change, and protecting AI models from attacks and manipulation. Also, according to the Caplan Artificial AI strategy for banks in Bosnia and Herzegovina, Serbia and Croatia Guide to digital transformation from 2026, successful implementation of AI in banking requires a systemic approach that includes the following phases: strategic assessments and goal definition, pilot and proof-of-concept phase; scaling and integration; and the optimization and continuous learning phase. The key success factors of an AI strategy according to Caplan Artificial AI strategy for banks in Bosnia and Herzegovina, Serbia and Croatia Guide to digital transformation, 2026 are: leadership support, where AI is a strategic priority and not an IT project; a culture of innovation where experimentation is allowed and mistakes are treated as an opportunity for learning; cooperation with local AI experts who understand the specifics of the banking market and a focus on data management as the foundation of successful AI implementation.

The main obstacles, or risks, that arise on the path to AI implementation in the banking industry, according to the Kellton research: AI in Banking. Use Cases, Benefits, and the Future of Finance, AI/ML from 2026 are: outdated systems and data silos; the problem of the “black box”, explainability and transparency; the evolution of data privacy and cybersecurity; the talent gap and cultural resistance. Banks are investing heavily in privacy-enhancing technologies to process data without revealing individual identities, as well as in retraining, reassigning employees from manual tasks to monitoring and refining AI-driven workflows. Successfully overcoming these obstacles requires a delicate balance between aggressive digital expansion and the conservative principles of traditional financial stability, where banks must manage risks, human capital, and digital trust.

According to the Kellton study: AI in Banking. Use Cases, Benefits, and the Future of Finance, AI/ML from 2026 in the coming period AI will move from backend tools to digital interfaces, where over 90% of financial functions will use autonomous agents for the end-to-end user experience. It also highlights the development of the so-called invisible banking, the rise of agent-based financial advisors, collaboration between humans and AI (CoBots) where the branch of the future will have CoBots that help employees create sales opportunities and focus entirely on the emotional needs of customers.

5. DEGREE OF MATURITY OF ARTIFICIAL INTELLIGENCE ADOPTION IN DEVELOPED BANKING SYSTEMS AND RESEARCH RESULTS

The In order to determine the degree of maturity of adoption of AI in developed banking systems, and for the needs of the empirical part of the work, the Evident AI Index will be used as an additional analytical framework. According to the Evident Insights report, The Evident AI Index Key Findings Report: The global standard benchmark from the year 2025, the Evident AI Index is a global standard indicator of the degree of maturity of the application of AI in developed banking markets and is of great importance to both banks, investors and financial advisors for measuring performance and monitoring progress over time in order to improve in areas where it is needed; but also identifying best practices, informed strategic decision-making, promoting transparency and responsibility, as well as encouraging competition and innovation.

The Evident AI Index was launched in 2023 as the most comprehensive and reliable indicator of its kind, which analyzes the world's 50 largest banks across North America, Europe and the Asia-Pacific region. According to Evident

Insights 2025, the Evident AI Index evaluates 50 banks based on over 100 individual indicators categorized into four pillars: talent, innovation, leadership, and transparency. Based on this index, the practices of leading global banks for 2025 will be presented, and then compared with available data on banks in the Republic of Serbia in the next chapter. According to Evident Insights, The Evident AI Index Key Findings Report: The global standard benchmark from 2025, measures the maturity of AI implementation in banking across four dimensions:

1. Talent – analyzes the bank’s ability to attract, retain, and develop AI experts, including an assessment of the size and structure of AI teams. This pillar includes an analysis of over 200 jobs in five core competency areas: AI development, data engineering, AI model risk, AI software implementation, and AI product management.
2. Innovation – measures the bank’s ability to generate new AI ideas and applications, tracking patent activity, research and business implementation, as well as investments and acquisitions focused on partnerships, as well as engagement with the open ecosystem.
3. Leadership – a pillar that assesses the commitment and vision of the bank’s leaders in developing AI applications, where the leadership team’s focus is on AI applications through development strategy, communication, executive team composition, team leader positioning and external engagement in monitoring areas related to AI applications.
4. Transparency - a pillar that examines the extent to which banks focus on the implementation of responsible AI, as evidenced by the formation of special teams within the bank for the responsible implementation of AI, the publication of ethical principles and codes of conduct, as well as internal acts and initiatives on responsible AI, all with the aim of making use cases explainable, auditable and reliable, thereby reducing regulatory and reputational risk, while strengthening the trust of clients and investors.

The Evident AI Index is calculated using a weighted scoring system, where each pillar contributes a certain percentage to the overall result, and according to the Evident Insights report from 2025, the weights are as follows: talent - 45%; innovation – 30%, leadership – 15% and transparency – 10%.

Table number 1 shows the ranking of the first ten banks according to the value of the Evident AI Index for the year 2025:

Table 1: Evident AI Index Rankings – The first ten banks

Bank	Rank +/- YoY change 2025 vs 2024	TALENT	INNOVATION	LEADERSHIP	TRANSPARENCY
JPMorganChase (SAD)	1 -	2 -	1 -	1 +2	1 -
Capital One (SAD)	2 -	1 -	2 +1	20 -6	17 -3
Royal Bank of Canada	3 -	12 -6	3 -1	3 +5	3 +7
CommBank (Australija)	4 +1	4 +3	13 -1	4 -2	2 +3
Morgan Stanley (SAD)	5 +5	13 +5	4 -	9 +8	21 +21
Wells Fargo (SAD)	6 -2	6 -2	5 -	40 -4	14 -6
UBS (Švajcarska)	7 -1	3 -	25 -7	7 +8	4 +11
HSBC (UK)	8 -1	14 +1	8 +1	15 -10	6 -3
Goldman Sachs (SAD)	9 +2	7 +6	9 -3	18 +9	23 +14
Bank of America (SAD)	10 +5	10 +1	7 +4	12 +6	24 -4

Source: Evident AI Index Banks: Key Findings Report, Evident Insights 2025.

Analyzing the 2025 Evident Insights report, key findings include:

- the dominance of North American banks where US and Canadian banks continue to lead the list, holding 7 of the top 10 spots globally. JP Morgan Chase is the leader, as the only bank in the top 3 in all three pillars, where the two undisputed leaders JPMorgan Chase and Capital One have convincingly defended their positions 1 and 2 compared to 2024, as well as Royal Bank of Canada;
- another five banks CommBank, Morgan Stanley, Wells Fargo, UBS and HSBC have maintained their status among the top 10, of which Morgan Stanley has achieved a significant jump of +5 points compared to the previous year;
- the explosion of AI talent (where one in 50 employees at large banks works in data and AI-related positions);
- the rise of generative AI (where 85% of solutions are focused on internal use and employee assistance);
- the connection to financial results (strong correlation between AI maturity and operational efficiency where around 60% of banks have reduced the cost-to-income ratio);

- increasing transparency (application of responsible AI and transparent reporting by banks on specific outcomes of AI projects).

Also, according to the Evident Insights report from 2025, the demand for AI Product Managers and AI ethics experts has drastically increased in the Talent pillar, where leaders like JPMorgan Chase and Capital One are not only hiring, but implementing massive "AI literacy" programs for all employees. In the second pillar of innovation, banks such as Royal Bank of Canada and JPMorgan are publishing scientific papers on par with tech giants (Google, Meta) where the focus is on partnerships with AI startups and universities. In the third pillar of Leadership & Strategy, AI strategy comes directly from the executive board chair and board of directors where leaders treat AI as a long-term investment, not a short-term expense. Banks that quickly make decisions on the implementation of new models such as generative AI jumped the most in the ranking, such as the example of the Morgan Stanley bank. In the pillar Transparency/Responsible AI, as part of the Governance pillar, which has become crucial due to regulations such as the EU AI Act, a growing number of banks are publicly documenting how their AI models make decisions, for example when approving loans, in order to avoid bias. Also, banks are beginning to publicly communicate how much AI has saved them money or increased revenue, which was not the case before, while in the area of cyber security, transparency about the risks of applying AI models has become a standard for banks that want to keep their clients' trust.

According to the above, we can also conclude that the difference between the winners and the rest is that the leaders integrate all four pillars, that is, they use talents to push innovation, with strong leadership support and complete transparency towards regulators. Bank leaders in the application of AI are actively adapting employees, policies and business processes, while at the same time responsible application of AI in order to increase efficiency, improve the decision-making process and encourage innovation in the banking sector.

6. APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE BANKING SECTOR OF THE REPUBLIC OF SERBIA AND RESEARCH RESULTS

The banking sector in the Republic of Serbia is making significant progress in adopting AI technology. Although considered a traditional industry, it has bravely and quickly embraced all the challenges brought by the development of advanced technology and digital transformation, which is not just a technological change, but represents a fundamental change in the way our banks understand and serve their clients. Currently, 19 banks, seven payment institutions, six electronic money institutions, two virtual currency service providers, 16 financial leasing providers, 4 voluntary pension fund management companies, 7 voluntary pension funds, 16 joint-stock insurance companies, 4 joint-stock reinsurance companies, as well as fintech companies, which closely cooperate with these financial service providers, operate in the financial market of the Republic of Serbia.

According to the announcement of the NBS on the results of work in 2025, applications in the financial sector include: blockchain technology/DLT, AI, machine learning, cloud, Big data. In the Republic of Serbia, ten banks are already using AI, while five banks are planning to start implementing it. Six banks, in addition to the existing application, plan to improve the application of AI in their business processes. AI is most often applied in banks in Serbia in the following areas: Predictive Analytics (seven banks), Robotic Process Automation (six banks), Machine Learning (four banks) and Real time Analytics (three banks). The National Bank of Serbia uses AI through advanced supervision SupTech, Supervisory Technology and through the modernization of RegTech payment systems, ensuring the stability and security of the domestic financial market. According to the announcement of the NBS from the portal business side regarding the use of AI in its work from 2024, the NBS uses Predictive Analytics and Machine Learning for the purposes of the early warning system, which predicts the probability of a problematic situation in banks using machine learning techniques (self-organizing maps and logistic regression Lasso). With this, the NBS monitors the riskiness of banks from the aspect of the probability of a problematic situation. Within the IPS system there is a fraud management module, which provides a fraud detection mechanism. Machine Learning NBS uses for assessments of the macroeconomic environment for scenario validation during stress-testing of the banking sector, but also as an additional tool when projecting a reference indicator for evaluating the countercyclical protective layer of capital. Real time Analytics, Video/Image Analytics, Robotic Process Automation as tools also play a role in the monitoring of certain processes, in preparation for printing and image processing, as well as in the automation of production processes. Also, starting in 2022, the NBS uses a model that allows inflation to be monitored in real time. the so-called web scraping.

According to the Caplan Artificial AI strategy for banks in Bosnia and Herzegovina, Serbia and Croatia Guide to digital transformation from 2025, key AI initiatives in the Serbian banking sector include: advanced algorithms for credit scoring based on alternative data sources; real-time fraud detection systems that analyze transactions in milliseconds; personalized financial recommendations through AI analysis of consumer habits and voice banking solutions in the Serbian language. Also according to the same source Caplan 2025, key areas of application of AI in our banks are: a revolution in customer support through AI chatbots and the ability to resolve up to 80% of standard queries without human intervention; advanced risk analysis and credit scoring; real-time detection of fraud that deviates from typical customer behavior, geographical anomalies in transactions, speed and frequency of transactions, correlations between

different computers and users, personalization of banking services. In accordance with the 2025 NBS announcement, the regulator requires our banks to provide detailed documentation of AI risk management models, a mandatory audit of algorithms used for credit scoring, and preparation for compliance with the future AI law that is currently being drafted.

In the announcement on the results of the work in 2025, the NBS did not list the names of banks that apply AI in their operations, and this paper presents publicly available data that could be obtained by searching bank websites, other public sources, and business reports of our banks. Available data indicate that these include large systemically important banks, such as Raiffeisen Bank, Banca Intesa, OTP, Aikbank, NLB Komercijalna Banka, Unicredit Banka.

Raiffeisen Bank was named the best digital bank in Serbia in 2025 by Global Finance magazine for the past 8 years, representing the main driver of the transformation and introduction of AI in the Serbian banking sector. Based on publicly available data from the Raiffeisen Bank website, the strategic approach is reflected in the importance of digital transformation by the bank's board, a focus on data as a new fuel in modern environmental conditions, and investments in the education of existing employees. The implementation of AI in Raiffeisen Bank refers to advanced models for predicting credit risk, personalization of offers in real time through a mobile application, a voice banking assistant in the Serbian language, the so-called REA, as the first conversational bot on the market. The focus is also on automating document processing, faster access to knowledge, as well as supporting operations. The goal is for AI to be present in everyday activities for both users and employees, and to bring measurable benefits, whether through saving time, increasing accuracy, or better interaction with clients.

Intesa Bank, based on the source of publicly available information from the bank's website, has a special laboratory for AI that works within the Innovation Center, and deals with the development of practical solutions and theoretical research based on a comprehensive knowledge base about the specific requirements and limitations of the business and financial sector. It applies a rigorous scientific method to identify problems and find solutions using models to protect financial portfolios from significant and adverse market movements. Using AI, the team can analyze in seconds the most comprehensive set of risk factors, which used to take weeks. The laboratory is a partner of the Institute for Scientific Exchange (ISI), a research institution in Turin. Through the application of AI, Intesa Bank helps ISI to stimulate research while developing practical solutions that can be applied in modern business.

OTP Bank, based on sources of publicly available information from the bank's website, actively applies AI through strategic partnerships, internal innovations and the development of digital services, and in its application always points out that AI transforms banking, but trust and people (employees and clients) remain its essence. Within the bank, it has a Directorate for Data Management, AI and Innovation, and is becoming a bank that is proactive in applying AI. One of the most visible examples of the application of AI in the bank are chatbots and virtual assistants. The OTI assistant already today answers customers' frequently asked questions, relieves employees and allows them to focus on more complex tasks. In parallel, it has an internal AI assistant, a tool that helps employees find key information faster in a sea of documents. Ethics, transparency and data protection come first. The ambition is not just for the bank to introduce AI, but to do it thoughtfully and responsibly, so that the client always knows that his data is safe. OTP in cooperation with the company SambaNovaSystems is creating the fastest AI supercomputer in Europe, while Global Finance included the OTP Group Innovation Center OTP LAB among the best financial innovation laboratories in the world for the sixth consecutive year.

AIK bank as a domestic bank is focused on a revolution based on the application of AI where powerful mathematical models work in the back office and already bring enormous value in fraud detection, credit score and customer relationship management. Based on the available information from the bank's website, as well as AIK Bank, since 2026 it has been using an integrated approach in order to provide personalized solutions and an efficient user experience. It also uses chatbots, biz assistants and speech models in communication with clients. The next step is the application of AI agents that not only analyze data but also perform complex tasks.

7. CONCLUDING REMARKS

AI has the power to revolutionize financial services by unlocking new levels of efficiency, hyper-personalization, predictive insights, fraud detection, and real-time decision-making. Banks that use AI wisely can position themselves as industry leaders, delivering faster, smarter, and more personalized services to customers while optimizing business processes. The key to implementing AI lies in the smart use of technology, compliance with regulatory requirements, and ethical principles in data management, where AI is used to increase efficiency, productivity, and drive innovation in the banking sector.

The paper provides theoretical and practical implications for understanding and implementing AI in the banking sector, provides important guidelines for top managers and bank owners to measure success and monitor progress in implementing AI, allowing banks to assess their maturity compared to their competitors, identify areas where they are successful and areas where improvements are needed. It also provides examples of best practices from successful global

banks in implementing AI, in order to make decisions about their own development strategies and investments in AI, promotes transparency, responsible AI implementation and trust in the use of AI in the banking sector.

Banks are already transforming from traditional institutions that provide stability and which clients trust to technology companies, which do not lose their traditional role but strengthen it with innovations and new advanced technologies. Virtual assistants, predictive analytics and personalized offers are clear indicators of this transformation. And what awaits us in the future? In the coming years, AI will not change the essence of banking, which is trust, but it will change the way it is built on a daily basis. This means that the future of banking is not in universal solutions, but in a unique experience tailored to each client, where the application of AI plays a major role.

The proposal for future research primarily relates to the application of proactive agent AI, as well as to the stability and security reflected in exposure to various types of non-financial risks, especially in the area of cybersecurity threats, where the bank of the future will represent a combination of technology, responsible regulation and lasting trust in times of rapid change, uncertainty and the need for resilience. Ethics, data quality and transparency are the key to trust, and banks that implement AI in accordance with these principles will be the ones that progress faster.

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