

# Development of Financial and Monetary Institutions Based on an Artificial Intelligence in Light of Monetary Policy

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**Abstract** - This study aims to identify the importance and benefits of artificial intelligence and its potential to understand modern developments and trends and their applications in financial and monetary institutions and the extent of its contribution to increasing profitability and reducing costs by improving financial services and financial performance, as well as benefiting from its ability to handle large amounts of data, identify effective trends, and make multiple and wise choices in a way that can lead or work to increase productivity, improve the decision-making process of these institutions, with the ability to reduce costs. Artificial intelligence also plays a role in using effective measures to prevent fraud and financial deception, and it also has the ability to develop advanced investment strategies that benefit financial and monetary institutions, enabling them to perform and perform special and related tasks such as financial credit recording, financial evaluation, and improving the financial and investment portfolio of users and clients.

**Keywords** - Artificial Intelligence, Financial and Monetary Institutions, Public Spending and Artificial Intelligence, Commercial and Financial Value of Artificial Intelligence, Monetary Policy.

## I. INTRODUCTION

Artificial intelligence (AI) is one of the most important industries of the Fourth Industrial Revolution, with its multiple applications in all fields and areas of life. Although it was merely a dream and imagination published in mid-February, it has become a reality today. Since then, there has been significant progress and rapid leaps in technological advancement in many ways, from tomorrow to specializations and fields in general, and financial and monetary services in general. This year showcases the technologies of the financial, social, and accounting century. This is not only used to change industries and production methods, increase revenues, and reduce costs, but its scope can extend beyond that, and industrial technology becomes indispensable and indispensable, especially in financial and ancient institutions.

## II. LITERATURE REVIEW

- **Amel Benali (Modern Trends In Artificial Intelligence For The Banking Sector: A Case Study Of Algeria):** This study aims to demonstrate that the new technological discovery of artificial intelligence has a significant role in the applications of the financial and banking sector. Its importance is highlighted in enhancing the banking sector and its contribution to profitability by improving financial and knowledge services and financial performance. The study results indicated that there has been no widespread progress in this area due to the lack of societal awareness and acceptance of such technological developments. Therefore, it is necessary to adopt a smart regulatory strategy with effective implementation that helps build strong relationships between the financial and banking sector and users and customers and enhances trust between them. This is achieved by protecting their data and privacy, providing them with prompt service through electronic money transfers, saving time, and adapting to changes, thus eliminating fraud, deception, and money laundering.
- **Ashima Narang et al (Artificial Intelligence in Banking and Finance):** This study highlights how AI

technologies can significantly improve and develop financial decision-making to increase overall financial returns and reduce operational costs, as well as to ensure sustainable AI adoption in financial and banking services. The primary objective of this study was to identify the most significant benefits and challenges associated with integrating AI with the banking sector. The most important findings of this study were the need to open up AI algorithms, address data biases, and establish accountability mechanisms. These are critical aspects that deserve continuous exploration and improvement, as well as to promote the harmonious coexistence between AI technological innovation and responsible business practices in the banking and financial sector.

- **Sheela Margaret et al (The Influence and Impact of AI-Powered Intelligent Assistance for Banking Services):** The study demonstrated that AI has the potential to transform the global financial system by using chatbots to provide a better experience and service to customers and users and solve financial and banking problems. This is something that banks, companies, and financial organizations can apply to achieve their goals of providing good financial services to users and customers. Hence, the study aimed to determine the impact of AI, specifically chatbots, in the banking and financial sector. The study concluded that most banks have adopted this technology to communicate with their customers and provide a personalized experience. One of the reasons for choosing chatbots is speed, security, simplicity, privacy, speed, and time savings.

#### ***A. First: The Concept of Artificial Intelligence***

The term artificial intelligence is divided into two words. The first is "artificial," which means human creation. This meaning is the result of activities or actions carried out through the manufacture and formation of things. The second word, "intelligence," means "thinking." Artificial intelligence is also referred to as a human-made entity endowed with the power of thought, which is the ability to understand new and changing circumstances or situations through perception, understanding, and learning [1]. Artificial intelligence is defined as a scientific project to create an intelligent machine capable of learning computer programs. It is inseparable from the need for human intelligence. Therefore, artificial intelligence is also called machine intelligence. John McCarthy defined it as "the science and technology," and it is the engineering related to the manufacture of intelligent machines [2]. Artificial intelligence is also referred to as a term used to describe machines that perform cognitive performance similar to human work, such as learning, understanding, thinking, and interaction. It can take many forms, such as technical infrastructure (algorithms), part of the process (production), or the end user [3]. Artificial intelligence (AI) is the science and engineering of making intelligent machines, especially intelligent software hardware and computers. It involves designing a robot to be controlled by a computer, or developing software to make computers think like humans. It is a combination of cognitive skills such as automation, machine learning, reasoning, hypothesis generation and analysis, natural language processing, and algorithmic mutation, all of which lead to insights and analysis similar to human intelligence [4].

The general meaning of artificial intelligence is that it is a new technological science that integrates theory, method, technology, and application system through computer simulation, to make it similar to the human thinking mode. It essentially seeks to be an ideal and mature intelligence through continuous simulation and exploration of human behavior [5]. The definition of artificial intelligence has given birth to very different information and formulas ranging from imitating human cognitive functions to the ability to interact with the general environment, through the machine's ability to achieve goals independently. Today, the technical progress of artificial intelligence lies mainly in the field of machine learning, that is, all algorithms that make it possible to learn by identifying relationships within data and producing predictive models in an autonomous manner [6]. Artificial intelligence (AI) encompasses a set of technologies that enable machines to simulate human intelligence, machine learning, and robotic process automation in the financial, monetary, and service contexts. It also analyzes large-scale data sets and extracts insights to enhance decision-making and operations across various functions, such as financial trading, financial management risks, and customer and individual service. The adoption of AI in the financial and monetary field has developed rapidly in recent times, driven by several factors. First, the increasing volume of data generated by financial and monetary transactions and financial market activities. The interactions of participating individuals and customers have created multiple opportunities to leverage AI for analysis and prediction in various activities. Second, advances in computational

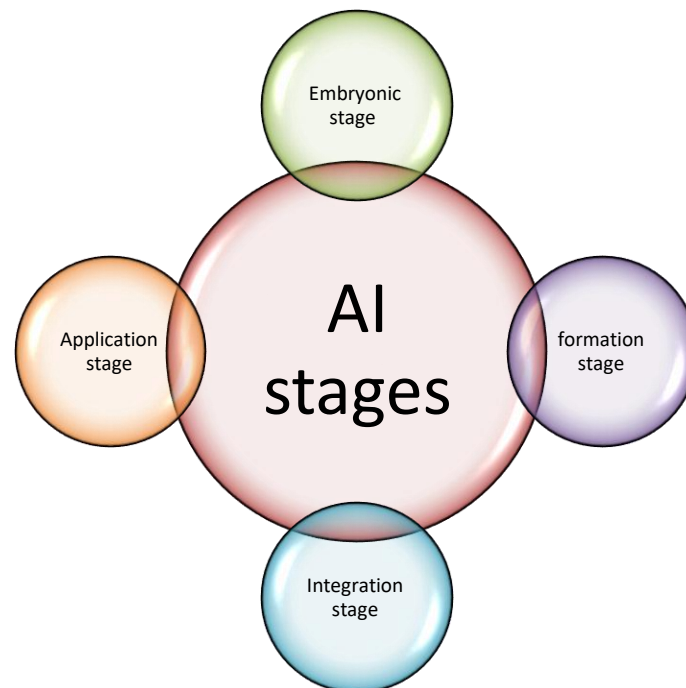
power and algorithmic technologies have made AI more accessible and scalable from a financial and monetary perspective for various institutions and sectors. Finally, competitive pressures and the continuous pursuit of operational efficiency and advanced innovations have encouraged companies to invest in AI-based solutions to gain a competitive advantage within the financial and monetary environment [7]. Here, it can be said that artificial intelligence is based on two basic concepts. The first concept involves examining the cognitive processes of the human brain, while the second concept focuses on representing these processes using machine learning techniques [8].

### ***B. Second: The Historical Beginning of Artificial Intelligence***

In the past, artificial intelligence was just a fantasy, but now it has become an integral part of daily life. The idea of a thinking machine goes back a long time, and was first mentioned in ancient Greece, but it gained special importance after the birth of computing, specifically when Alan Turing published his statement “Computing Machinery and Intelligence” in which he asked whether machines could think [9]. Three industrial revolutions have been observed over time. The first began in 1784 when the first steam engine was observed. The second revolution began in 1870 when electricity was introduced. The third revolution was the information technology revolution in 1969. Today, we are witnessing the fourth revolution: artificial intelligence [10]. Therefore, the development of artificial intelligence can be understood through several stages, which can be divided as follows [11]:

1. Embryonic stage of artificial intelligence.
2. Artificial intelligence formation stage.
3. AI Application stage.
4. AI Integration stage.

Thus, we find that artificial intelligence technology has played an important role in various areas of society.



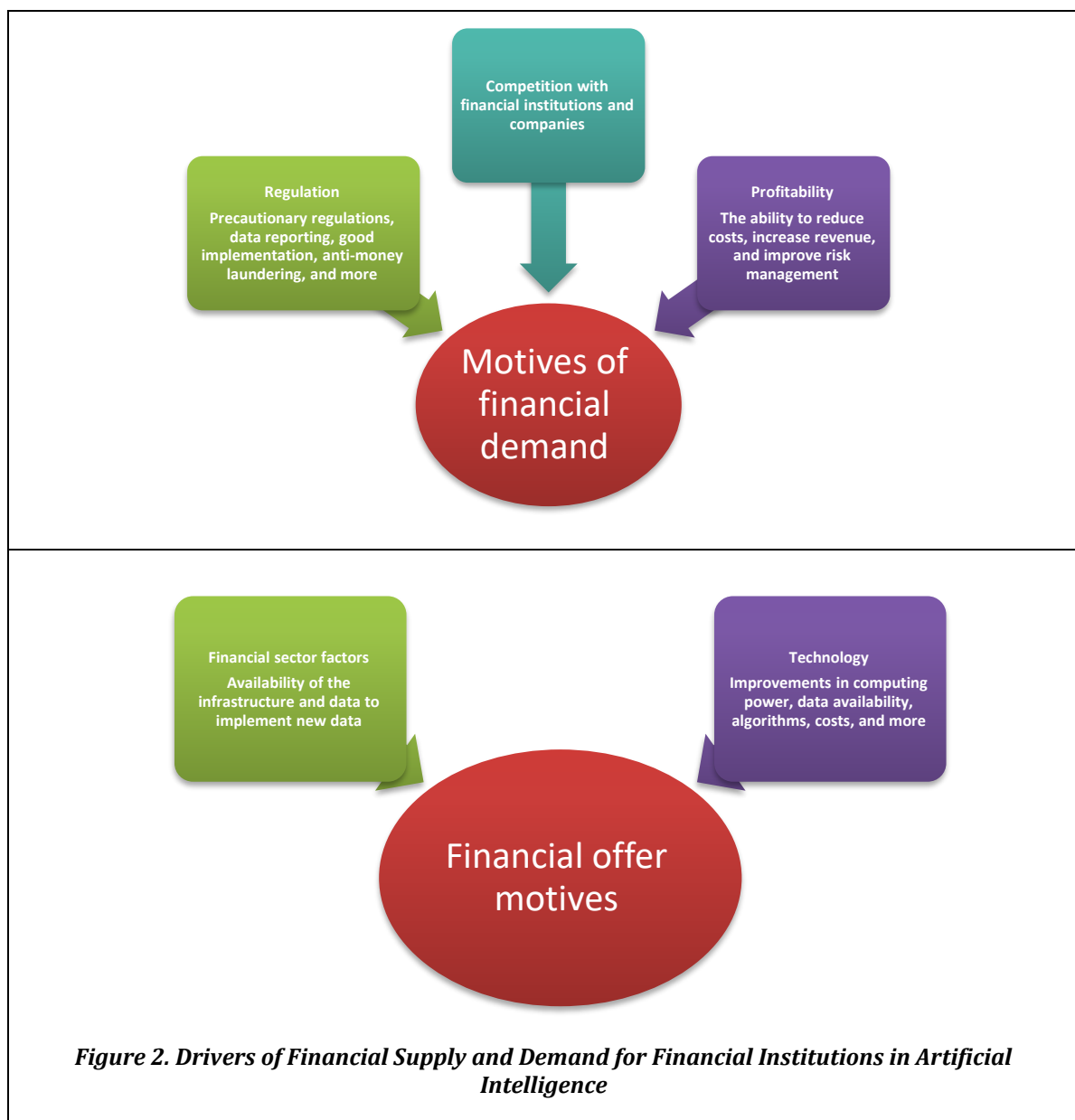
***Figure 1. Stages of Artificial Intelligence***

### ***C. Third: The Benefits of Artificial Intelligence in Financial and Monetary Institutions***

In recent years, artificial intelligence has emerged as a transformative power in financial and monetary institutions, a revolution in traditional practices, and the opening of new opportunities for growth and innovations from the algorithm trading to the development of the work of financial and monetary institutions, and thus artificial intelligence re-forms itself in every aspect Financial and monetary institutions emerge through the following points [12][13][14][15].

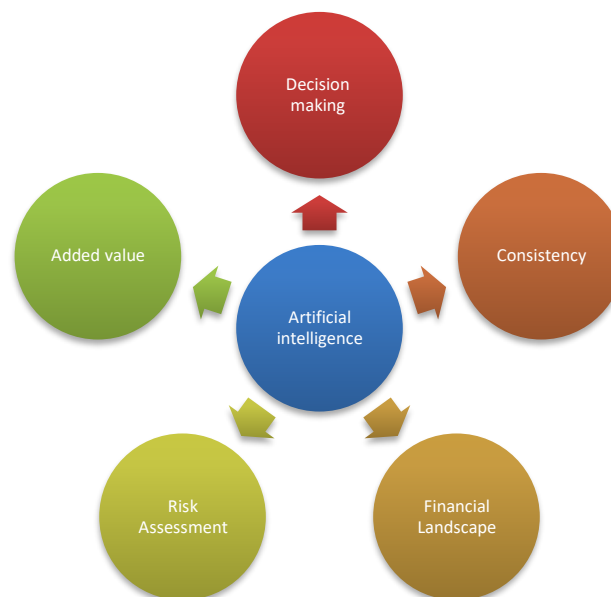
- Enhancing efficiency and consistency.
- Reducing costs and increasing financial revenues.
- Developing user and customers experience.
- Optimization management efficiently.
- Managing the risks based on artificial intelligence.
- Better auditing of data and files.

The adoption of financial institutions of artificial intelligence came as a result of a group of supplies and financial demand, which is to meet the needs of users such as cost reduction, financial gains and risk management, and improve productivity, as all of them can contribute to increasing profitability, , And providing the number of data sources, the timing of data access, growth in data warehouses, data granules, diversity of data types and efforts to improve data quality, improve operations instead of users, create interactions between systems and employees who use artificial intelligence and increase the need for effective organizational compliance such as precautionary policies, These factors may also lead to "armament races" where the market participants find that it is necessary to keep pace with the adoption of their competitors for artificial intelligence and machine learning, adopting the rules for combating money laundering and so on [16].



In addition to the above, there are some capabilities and potentials that artificial intelligence can implement within financial and monetary institutions [17], the most important of which are:

- a) **Risk Assessment:** This includes due diligence and risk assessment of complex data and its monitoring to facilitate effective lending operations for users and customers.
- b) **The Financial Landscape:** Artificial intelligence can contribute to introducing various changes in the financial and banking system.
- c) **Added Value:** AI replaces repetitive tasks performed by humans in the financial sector, reducing costs and increasing accuracy and speed, which adds value to customers and users.
- d) **Consistency:** AI ensures that financial and monetary institutions are more specific and consistent in their operations, leading to more efficient handling of user and customer inquiries.
- e) **Decision Making:** Errors can be completely avoided or reduced by improving the quality of decisions made at various levels of management, which also ensures more accurate forecasting.



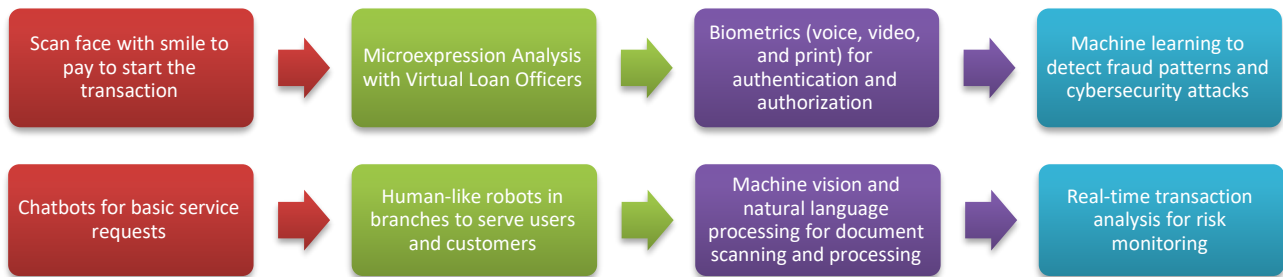
**Figure 3. Artificial Intelligence Capabilities in Financial and Monetary Institutions**

One of the most important operational aspects of artificial intelligence that can play a significant and important role within financial and monetary institutions is [18]:

From a marketing perspective: Data analysis helps better understand financial product needs and helps users understand and improve the features of a particular financial product. This ultimately leads to more adaptive financial products. From a business perspective: AI technologies can provide powerful tools (financial and banking services, assistance, complex simulations, robo-advisors) to make it easier for clients, advisors, or users to understand financial products and services that sometimes seem too rich or complex. From a regulatory perspective: AI is likely to help detect financial fraud and money laundering, which pose a critical challenge to the safety and stability of the financial system. From a risk management perspective: AI enables better management of multiple risks by providing a set of powerful tools capable of controlling and managing those risks by helping support the financial decision-making process. Finally, from a financial perspective: AI enables significant savings by automating and optimizing repetitive tasks, as well as streamlining financial transactions and operations [19].

In addition, artificial intelligence can provide services to banking financial institutions across a variety of financial environments, including voice assistants, biometrics, complex legal and compliance processes, combating fraud risk monitoring, and credit underwriting using smart contract infrastructure [19]. Figure (4)

illustrates the work of financial and banking institutions in extensively using artificial intelligence technologies to improve user and customer experiences and operations [20]:



**Figure 4. Expansion of the Use of Artificial Intelligence in Financial and Banking Institutions**

#### **D. Fourth: Artificial Intelligence Applications in Financial and Monetary Institutions**

Artificial intelligence applications have recently spread in financial and monetary institutions in order to provide financial services in a more accurate and secure manner, through digital payment services, digital currencies, cross-border currency transfer, various payments, reducing financial costs and achieving the highest possible return, and other financial and banking operations [21]. To achieve this, the implementation of artificial intelligence is extremely important for these institutions, and the most important of these applications are [14]:

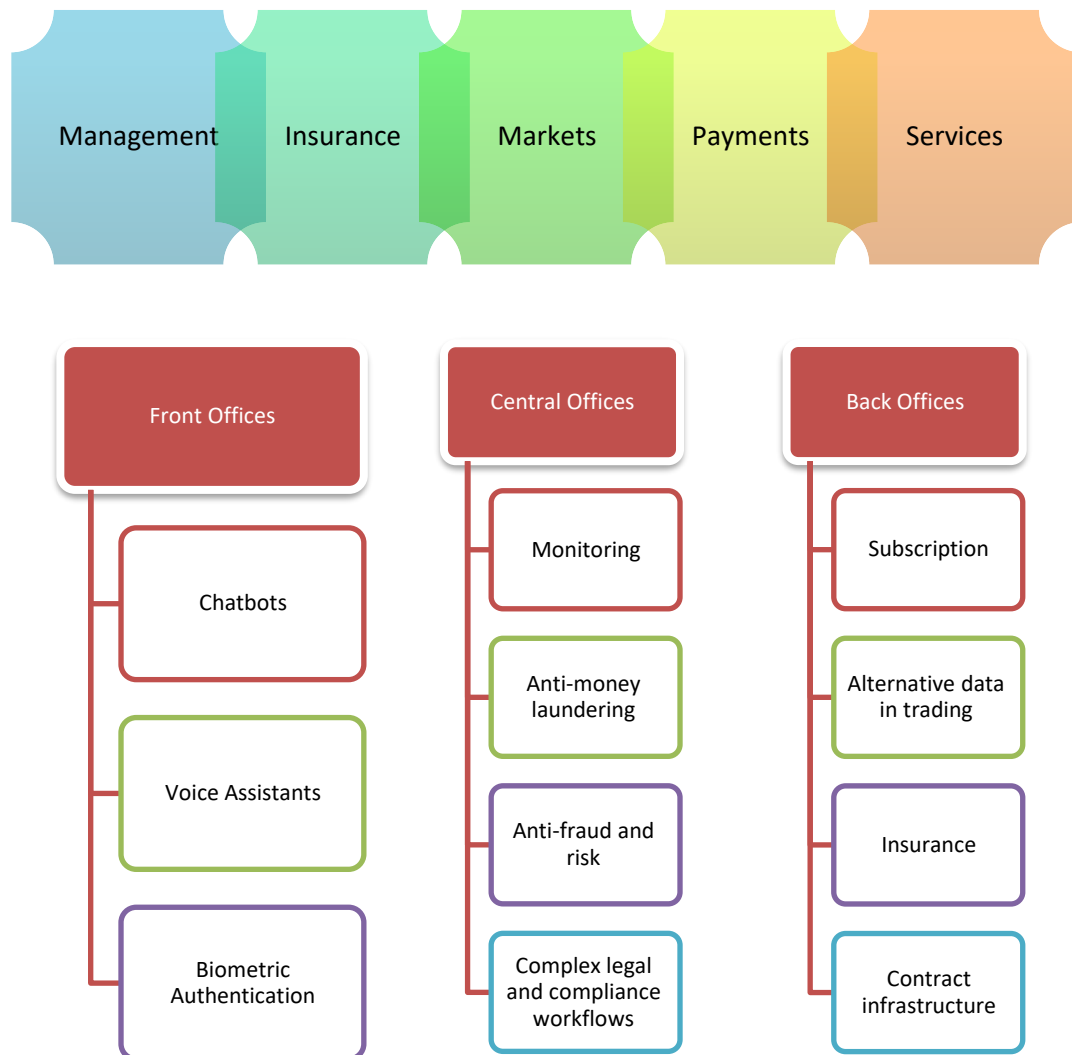
- Personal online and mobile banking services (quick transactions).
- Personal Financial Guidance.
- Fraud and Financial Fraud Detection.
- Interactive Voice Response Systems.
- Credit Recording and Decisions.
- Protection and Security.
- Back Office Processing Using Digitization and Automation.
- Personal Financial Wealth Management.
- ATMs.
- Smart Digital Wallets.
- Anti-Money Laundering.

##### *a. Chatbots*

It is one of the most important applications of artificial intelligence used in financial institutions, as it has the ability to provide high returns and low costs through money transfers, and efficiently handle access to mini-statements and balance inquiries. In customer-user interactions, financial and banking institutions use chatbots to act as agents to serve these people. Chatbots have advanced features to effectively handle user and customer inquiries sent via electronic platforms. Customers and users can be directly connected to the responsible person who can provide an appropriate and quick solution, and handle their issues immediately and directly. Some financial and banking institutions are conducting extensive tests to determine the role of chatbots in marketing to users and customers across various key tasks, including efficiently handling bank card theft, answering questions related to ATM locations, providing detailed information on foreign branch opening hours and exchange rates, and other services [4].

Artificial intelligence applications within financial and monetary institutions operate through a set of tools and a series of operations, which are represented by front offices, or what are known as reception offices, middle offices, and back offices. The work of the front offices in these institutions is a channel of communication between users in an automated manner, such as opening their accounts and transferring data and information, which is usually automatic, including credit registration, insurance, and chatbots that face users and customers. While the work of the middle offices is to detect and prevent financial institutions from fraud, financial fraud, and money laundering related to financial services, by interpreting, monitoring, and analyzing the largest amount of data and linking this data with new sources of information to facilitate their work. As for the back office, which is known for uses that focus on operations that facilitate the work of financial loans and bank credit by activating

bank subscription operations, including capital optimization, risk management, and market impact analysis, Figure (5) illustrates the application of the use of artificial intelligence tools within financial institutions [23].



**Figure 5. Uses of Artificial Intelligence Tools in Financial and Monetary Institutions**

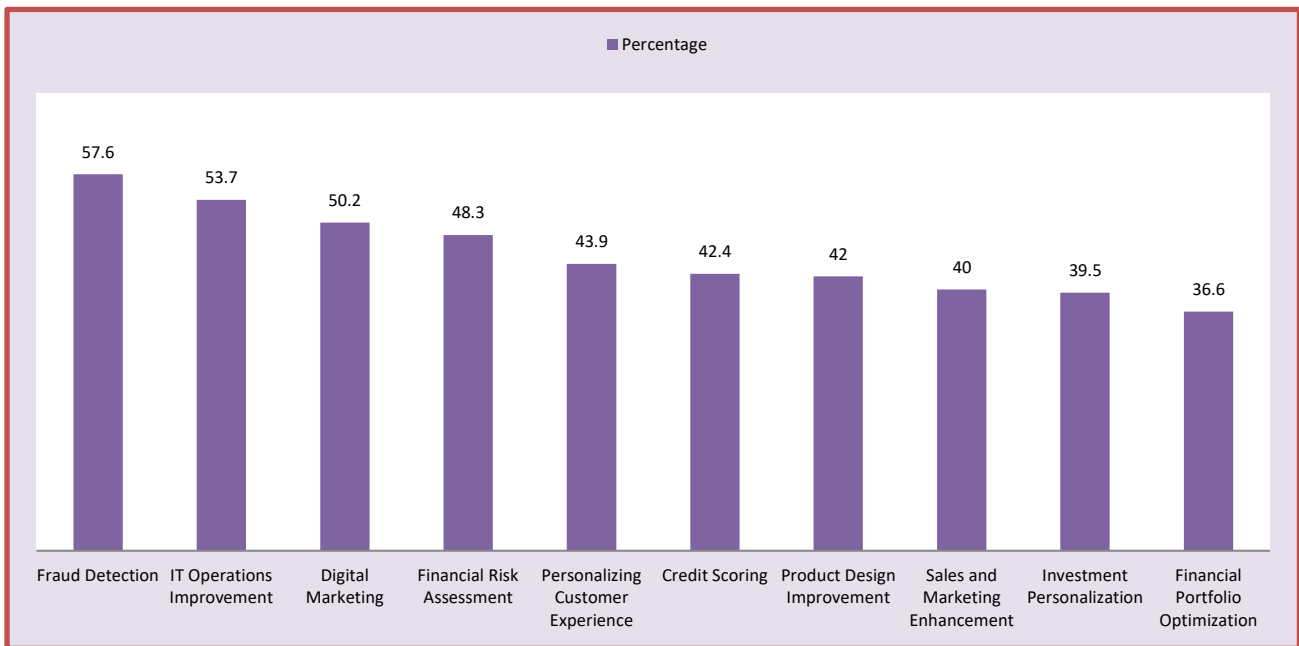
#### **E. Fifth: The Practical and Analytical Aspects of Artificial Intelligence in Financial and Monetary Institutions**

There are a number of practical and realistic examples of artificial intelligence in developing financial and banking transactions and services, including [24]:

- JPMorgan Chase's contract system.
- Citibank's fraud detection.
- Wells Fargo's chatbot for user and customer service.
- Vanguard's automated advisory service.
- PayPal's risk management system.
- HSBC's voice recognition for authentication.

HSBC, a global banking and financial services company, uses AI-powered technology for voice recognition and user authentication. By analyzing unique voice patterns and characteristics, AI algorithms verify the identity of customers and users during financial transactions and mobile banking services. This system also provides a secure and convenient authentication method, reducing reliance on traditional security measures such as passwords and PINs. Analytically, the 2022 Standard & Poor's Global Survey shows that financial institutions hold the second-largest market share in terms of the use of machine learning solutions, second only to the information technology and telecommunications industry, which stands at 18%. Figure (6) shows the areas of application in financial and banking institutions, by percentage, for the year 2022 [26].

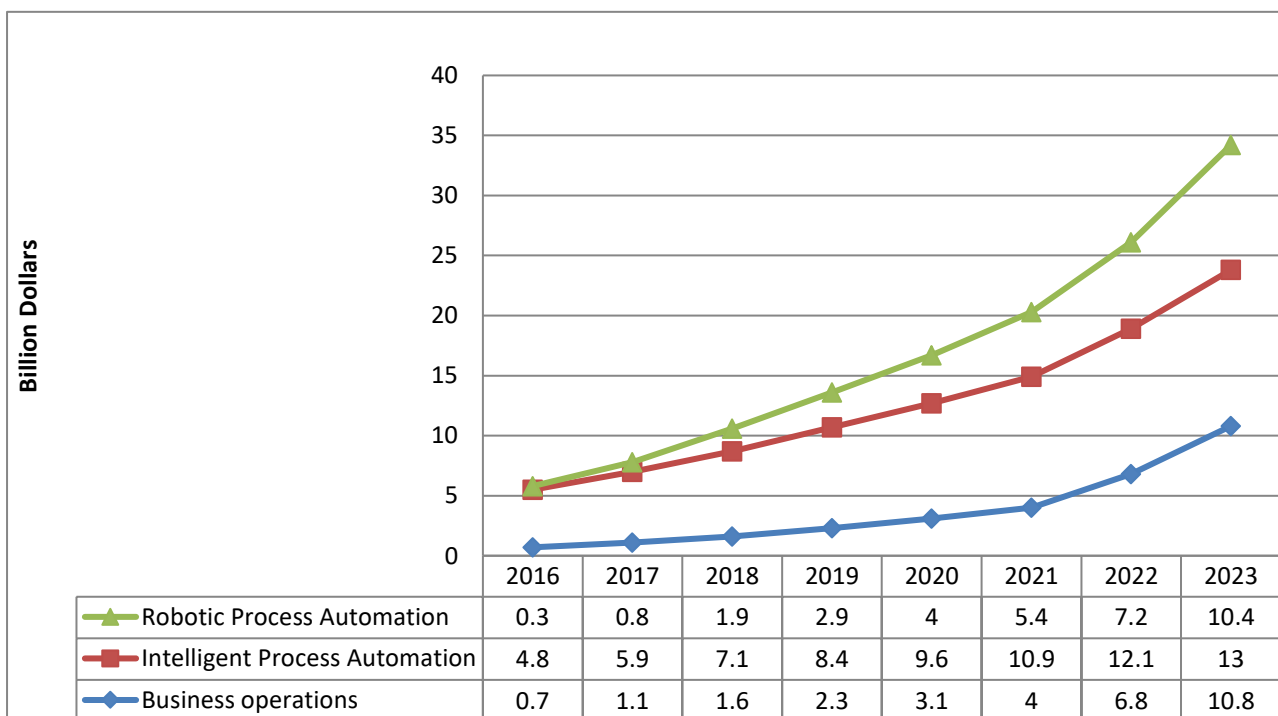




**Figure 6. Areas of Application of Artificial Intelligence in Financial and Banking Institutions**

#### **F. Sixth: Spending on Artificial Intelligence**

There is a significant increase in spending on artificial intelligence in each of (AI business processes, intelligent process automation, and robotic process automation). Figure (7) shows that spending on AI business processes reached \$0.7 billion in 2016, reaching approximately \$10.8 billion in 2023. Intelligent process automation reached \$4.8 billion in 2016, reaching \$13 billion in 2023. Meanwhile, spending on robotic process automation in 2016 was approximately \$0.3 billion, compared to \$10.4 billion in 2023. This significant interest and increased spending on AI processes is a result of the significant increase in revenues and financial returns. Figure (7) below illustrates the trajectory of this spending.

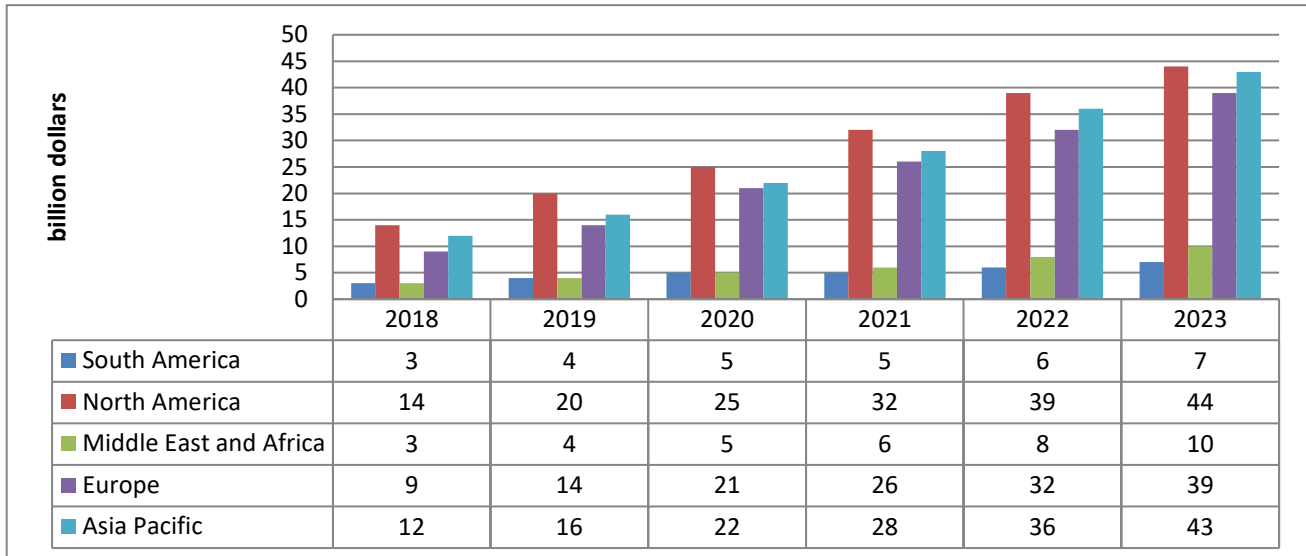


**Figure 7. The Volume of Spending on Artificial Intelligence**



### G. Seventh

The size of the financial commercial value of artificial intelligence in the global financial institutions industry. Financial institutions provide financial services to users and banking clients, and this is usually considered a financial trade applied with artificial intelligence, from which high-value financial returns are obtained. Figure (8) illustrates this.



**Figure 8. The Commercial Value of Artificial Intelligence for Financial Industry Services in the World**

When we look at Figure (8), we see that there is a continuous increase in the commercial value of financial institutions that follow artificial intelligence operations in the countries of the world, as the lowest value in 2018 was in South America, the Middle East and Africa, which amounted to 3 billion dollars, while the highest commercial value among these countries was North America, which achieved approximately 19 billion dollars, and this is what we also notice in 2023, where the highest value for these countries was North America, which amounted to 44 billion dollars in the use of artificial intelligence technology within financial institutions.

### III. CONCLUSION

Activating computer systems and artificial intelligence to perform advanced tasks typically requires human intelligence. These tasks typically involve learning, thinking, solving multiple and diverse problems, perceiving and understanding language, and even the ability to interact with the surrounding environment and the general public. In addition, systems can be created that can more accurately mimic human cognitive functions, allowing artificial intelligence to make highly accurate decisions, including experience, knowledge, and adapting to new information. Artificial intelligence can also mimic various cognitive functions such as perception and memory, or reproduce skills such as organizing, describing, and processing information. This stimulates the capabilities and work of artificial intelligence in many diverse fields, on the one hand, and its application in financial and banking transactions, on the other hand. This can be used to detect financial fraud, provide customer service, manage financial and monetary risks and financial portfolios, manage investments and financial wealth, and authenticate information through them, in a way that helps financial and banking institutions increase productivity and financial returns and reduce costs, while simultaneously ensuring accuracy and customer and user satisfaction.

Thus, we find that artificial intelligence has achieved significant progress in financial institutions, achieving the largest market share in machine learning in 2022, amounting to 18%. In terms of application, the largest percentage, at 57.6%, was in fraud detection, while the lowest percentage, at 36.6%, was in portfolio optimization. Spending on robotic process automation in 2016 was approximately \$0.3 billion, compared to \$10.4 billion in 2023. Regarding the use of artificial intelligence technology within financial institutions, North America achieved the highest commercial financial value among countries in the world in 2023, amounting to \$44 billion.

#### IV. REFERENCES

1. S. Margaret et al., "The Influence and Impact of AI-Powered Intelligent Assistance for Banking Services," *Proceedings of the International Conference on Emerging Trends in Business & Management (ICETBM 2023)*, pp. 374–385, 2023. [Google Scholar](#) | [Publisher Link](#)
2. H. Mallick et al., *Proceedings of the International Conference on Emerging Trends in Business & Management (Eds.): ICEMCI 2022, AEBMR 231*, pp. 393-400, 2023. [Google Scholar](#) | [Publisher Link](#)
3. M. Szczepański, *Economic Impacts of Artificial Intelligence (AI)*, EPRS | European Parliamentary Research Service, pp. 1-8, 2019. [Google Scholar](#) | [Publisher Link](#)
4. A. Benali, "Modern Trends in Artificial Intelligence for the Banking Sector: A Case Study of Algeria," *Educational Administration: Theory and Practice*, vol. 30, no. 7, pp. 185–191, 2024. [Publisher Link](#)
5. Y. Li et al., "Theory and Application of Artificial Intelligence in Financial Industry," *Data Science in Finance and Economics*, vol. 1, no. 2, pp. 96–116, 2021. [Google Scholar](#) | [Publisher Link](#)
6. O. Fliche et al., *Artificial Intelligence: Challenges for the Financial Sector*, pp. 1-33, 2018. [Google Scholar](#)
7. Shubham, and A. Dhimiwal, "Artificial Intelligence in Financial Services," *International Conference on AI in Cyber Security*, Jaipur, pp. 1-7, 2024. [Google Scholar](#) | [Publisher Link](#)
8. S. Ness et al., "Banking 4.0: The Impact of Artificial Intelligence on the Banking Sector and Its Transformation of Modern Banks," *International Journal of Innovative Science and Research Technology*, vol. 9, no. 2, 2024. [Google Scholar](#) | [Publisher Link](#)
9. J. M. Themudo, *The Impact of Artificial Intelligence in Banking*, Master's thesis, NOVA School of Business and Economics, pp. 1-62, 2021. [Google Scholar](#) | [Publisher Link](#)
10. R. Mardanghom et al., *Artificial Intelligence in Financial Services*, Master's Thesis, Norwegian School of Economics, pp. 1–104, 2019. [Google Scholar](#) | [Publisher Link](#)
11. Y. Q. Tang, "Corporate Finance Management in the Age of Artificial Intelligence," *International Journal of Frontiers in Sociology*, vol. 3, no. 12, pp. 141–146, 2021. [Google Scholar](#) | [Publisher Link](#)
12. M. Kaushik, and M. Sharma, "A Study on Artificial Intelligence (AI) in Banking Services," *International Journal for Multidisciplinary Research*, vol. 5, no. 6, pp. 1–9, 2023. [Google Scholar](#) | [Publisher Link](#)
13. H. Gurumurthyk, "Application of Artificial Intelligence (AI) in Banking Sector," *International Journal of Advanced Research in Commerce, Management & Social Science (IJARCMSS)*, vol. 4, no. 4(II), pp. 145–149, 2021.
14. A. Narang et al., "Artificial Intelligence in Banking and Finance," *International Journal of Innovative Research in Computer Science and Technology (IJIRCST)*, vol. 12, no. 2, pp. 130–134, 2024. [Google Scholar](#) | [Publisher Link](#)
15. S. Tripathi et al., "Role of Artificial Intelligence in the Banking Sector," *International Journal of Research Publication and Reviews*, vol. 3, no. 9, pp. 433-442, 2022. [Google Scholar](#)
16. Financial Stability Board (FSB), *Artificial Intelligence and Machine Learning in Financial Services: Market Developments and Financial Stability Implications*, pp. 1–41, 2017. [Publisher Link](#)
17. H. Vedapradha, and R. Hariharan, "Application of Artificial Intelligence in Investment Banks," *Review of Economic Business Studies*, vol. 11, no. 2, pp. 131–136, 2018. [Google Scholar](#) | [Publisher Link](#)
18. K. Sawant et al., "A Study of AI in Banking System," *Korea Review of International Studies*, vol. 16, no. 06, pp. 36–48, 2023. [Google Scholar](#) | [Publisher Link](#)
19. R. Thomas, *Building the AI Bank of the Future*, Global Banking Practice, pp. 1–63, 2021. [Google Scholar](#) | [Publisher Link](#)
20. N. Magdy, *Artificial Intelligence and Machine Learning*, International Monetary Fund, Economic Department, Introductory Booklet Series, no. 3, pp. 1-32, 2020.
21. A. Svoboda, "The Impact of Artificial Intelligence on the Banking Industry," *Journal of Banking and Finance Management*, vol. 4, no. 1, pp. 7–13, 2023. [Google Scholar](#) | [Publisher Link](#)
22. A. Fernandez, "Artificial Intelligence in Financial Services," *Economic Bulletin: Artificial Intelligence in Financial Services*, vol. 29, pp. 1–7, 2019. [Google Scholar](#) | [Publisher Link](#)
23. S. J. Dsouza, "A Study on the Impact of Artificial Intelligence in Financial Sector," *Journal of Emerging Technologies and Innovative Research (JETIR)*, vol. 6, pp. 263–269, 2019.
24. R. Jain, "Role of Artificial Intelligence in Banking and Finance," *Journal of Management and Science*, vol. 13, no. 3, pp. 1–4, 2023. [Google Scholar](#) | [Publisher Link](#)
25. A. Domokos, and P. Sajtos, "Artificial Intelligence in the Financial Sector: Innovation and Risks," *Financial and Economic Review*, vol. 23, no. 1, pp. 155–166, 2024. [Google Scholar](#) | [Publisher Link](#)
26. Statista, Business Value Derived from Artificial Intelligence (AI) in Banking Industry Worldwide from 2018 to 2030, by Region, Technology & Telecommunications, 2022. Online: <https://www.statista.com/statistics/994826/worldwide-artificial-intelligence-in-banking-business-value-by-region/>