Revolutionizing Banking and Finance: The Inexorable Rise of Artificial Intelligence

[1]Fibi Rizki Herdianti
IIB Darmajaya *Faculty of Economic and Business,* Bandar Lampung, Indonesia
fibirzkhrd@gmail.com

[2]Deni Yakijan
IIB Darmajaya *Faculty of Economic and Business,* Bandar Lampung, Indonesia
deniyapijan@gmail.com

[3]Anggalia Wibasuri
IIB Darmajaya *Faculty of Economic and Business,* Bandar Lampung, Indonesia
anggalia.wibasuri@darmajaya.ac.id

Abstract - **Since most banking and financial services require the use of technology, the adoption of artificial intelligence (AI) has emerged as one of the major factors influencing the success of financial organizations. In this case, the article delves into the transformative impact of Artificial Intelligence (AI) on the banking and finance sectors, exploring its myriad applications, benefits, challenges, and the future landscape. To do this, we prepared a review of the available literature. 13 journals were examined after a review of several marketing journals from two sources (Mendeley and ScienceDirect) was completed. The publications used for this study were published between 2021 and 2023. Future directions for related study were offered, as well as research implications.**

Keywords: Artificial Intelligence, Finance, Banking

I. INTRODUCTION

The concept of Artificial intelligence refers to a broad field of science encompassing not only computer science but psychology, philosophy, linguistics, and other areas. AI offers huge benefits to the global economy and financial services industry. According to a recent study, AI can create additional value of up to USD 1 trillion each year for the global banking industry. According to, the global financial services industry is expected to reach USD 28.529 trillion by 2025–2030 at a compound annual growth rate (CAGR) of 6%. This is mainly because of the substantial use of AI in the rearrangements of banking operations, particularly after recovering from COVID-19[1]

Financial banking is a crucial pillar of the global economy, facilitating the movement of funds and supporting economic activities. Data science and artificial intelligence (AI) have transformed the banking and finance industry, changing many aspects of operations and how customers make decisions [1]. It encompasses a broad range of services and activities related to managing money, providing credit, and facilitating financial transactions. Banks are at the core of this sector, serving as financial intermediaries that connect savers and borrowers to allocate capital efficiently.

Financial banks play a pivotal role in the economy by accepting deposits from individuals, businesses, and institutions, while also providing loans and credit to support various ventures. They facilitate payments, offer investment opportunities, provide financial advice, and engage in other financial activities to meet the diverse needs of their customers. The integration of AI into banking applications and services increases the technology's relevance in the sector and encourages a more customer-centric approach [2]. This also opens up space for continuous improvement.

Governments and regulatory bodies oversee financial banks to maintain stability, protect consumers, and ensure fair practices within the financial sector. Regulations set capital requirements, govern lending practices, monitor risk exposure, and enforce compliance with financial laws. Financial banking faces various challenges, including rapid technological advancements, cybersecurity threats, evolving regulatory landscapes, and changing customer expectations. The future of financial banking is likely to involve increased digitalization, the integration of artificial intelligence, enhanced customer experiences, and a focus on sustainable and responsible banking practices.

In the real economy and finance, AI has the potential to be a game changer. This could also benefit the 2030 Agenda of the UN, which seeks to foster cooperation, peace, and prosperity for people and the planet: as a result, a comprehensive strategy must be taken to recognize the digital transformation taking place around the world, which comes before the development of an inclusive digital economy as a non-negotiable [3]. The factors that continue to propel development in the financial sector, particularly in the delivery of banking and financial services, require further study.

We have given a succinct outline of the banking and financial revolution with the inescapable rise of intelligence in this introduction. With the development of artificial intelligence (AI), the banking and financial industries have seen significant changes. Next, we'll conduct a thorough investigation of this in the subsequent chapters. This article investigates how artificial intelligence (AI) is transforming financial institution operations, from customer relations to risk management, and it also examines the broader industry

consequences. Three main focuses of AI in Banking and Finance are:

A. *Characteristics of Banking and Finance*

The international economic system depends on the banking and finance industries. They are crucial in supporting economic activity, managing financial resources, and facilitating the flow of capital. Understanding banking and finance's features is essential for comprehending how these industries function, their place in the economy, and the range of financial services and products they provide.

The banking and finance industries provide a wide range of financial goods and services to satisfy the various needs of people, organizations, and corporations. These goods and services stand out for their variety and complexity:

- Deposit Accounts

Savings, checking, certificate of deposit (CD), and money market accounts are just a few of the several types of deposit accounts that banks provide.

- Loans and Credit Product

Financial organizations offer borrowers credit and loan products like credit cards, mortgages, company loans, and personal loans.

- Investment Services

Investment goods like stocks, bonds, mutual funds, and retirement accounts are offered by banks and investment companies.

- Payment Services

Online banking, mobile payments, wire transfers, and electronic financial transfers are all examples of payment services.

- Wealth Management

Investment and financial planning are provided by wealth management services, which are geared toward high-net-worth people and institutions.

- Insurance Services

Insurance products like life, health, and property insurance are frequently provided by banks.

- Trade Finance

Using services like trade finance and letters of credit, financial institutions promote international trade. The variety of financial services and products highlights how flexible banking and finance are to the changing demands of the economy and its participants.

The banking and financial industries are vibrant, complex, and essential to the world economy. The challenges posed by financial crises and systemic risk are included in the characteristics of banking and finance, along with financial intermediation, risk management, regulatory oversight, a wide range of financial products and services, technological advancements, globalization, and ethical and responsible finance.

Financial organizations and professionals must adapt and innovate due to the ongoing evolution of banking and finance, which is being fuelled by technological advancements, altering client expectations, and change regulatory environments. The banking and finance industries may promote global economic progress, financial stability, and people's and enterprises' well-being by embracing these traits and adapting to the evolving demands of both the economy and society.

This literature review investigates the transformative impact of artificial intelligence in banking and finance, focusing on the evolving landscape of customer interactions, risk management strategies, and operational efficiency as documented in contemporary research.

B. *Characteristics of Data Science*

Due to the expansion of data in numerous industries, the area of data science has recently become quite important. It includes a broad range of methods and procedures used to draw out important patterns, insights, and understanding from data. Understanding data science's characteristics is essential to comprehending its importance and effects in the data-driven world of today.

Data science's transdisciplinary nature is one of its core traits. Data science incorporates skills and knowledge from a number of disciplines, including arithmetic, statistics, computer science, domain knowledge, and data engineering. It utilizes various disciplines to address challenging issues with data processing, modelling, and interpretation.

- Mathematics and Statistic

The foundation of data science is mathematics, particularly statistics. Data analysis, hypothesis testing, and prediction are all done using statistical techniques. Data science relies heavily on ideas like probability, regression, and hypothesis testing.

- Computer Science

For the purposes of processing data, storing data, and creating algorithms, data science depends on computer science. For the analysis and manipulation of data, programming languages like R and Python are frequently utilized.

- Domain Expertise

Knowledge of a certain topic is essential for many data science efforts. To comprehend the context and correctly interpret the results, data scientists collaborate extensively with subject matter experts.

- Data Engineering

Data management, storage, and collecting are all part of data engineering. It covers activities like data integration, transformation, and cleaning, which are crucial for successful data analysis. Data science is an interdisciplinary field that enables experts from other fields to cooperate and contribute to the resolution of challenging data-related problems.

Data-driven decision-making is synonymous with data science. It enables businesses and individuals to make decisions based on data analysis insights and empirical evidence. Data-driven decision-making

uses data to make decisions rather than just relying on intuition or experience.

- Data Collection

The systematic gathering of organized or unstructured data from a variety of sources is a key component of data science. The analysis and decision-making process is built on top of this data.

- Data Analysis

To examine data and uncover significant patterns and trends, data scientists employ statistical and machine-learning techniques. They locate correlations, irregularities, and prognostic linkages in the data.

- Visualization

A crucial part of data science is data visualization. Stakeholders can immediately understand insights because it converts complex data into simple charts, graphs, and dashboards.

- Informed Decision Making

Organizations can take evidence-based decisions by utilizing data analysis and visualization. Decisions in a variety of areas, such as business, healthcare, and public policy, become more precise, effective, and informed as a result.

Making decisions based on data is essential for streamlining operations, enhancing goods and services, and obtaining a competitive edge.

C.   Characteristics of Artificial Intelligence

Creating intelligent agents or systems that are capable of carrying out activities that traditionally require human intelligence is the focus of the revolutionary and diverse discipline of computer science known as artificial intelligence (AI). It includes a range of tools, methods, and technologies that give robots the ability to think critically, pick up new skills, understand their surroundings, and communicate with people and other machines. Understanding AI's characteristics is essential to understanding its importance, promise, and limitations as well as how it can shape the future. Fundamental traits of AI include learning and adaptation. AI systems have the ability to learn new things and get better at what they do thanks to data-driven techniques. The ability to learn sets AI apart from conventional computer programs. AI systems are known for their autonomy and decision-making capabilities. These systems can work autonomously and make choices depending on their programming, their learning, or a mix of the two.

- Autonomous Agent

Drones and other autonomous agents are able to navigate and choose their course of action in unpredictable circumstances.

- Reinforcement Learning

AI agents can learn the best decision-making procedures through reinforcement learning by interacting with their environment and experiencing rewards or consequences.

- Expert System

Expert systems are artificial intelligence (AI) programs that replicate human knowledge and judgment in particular fields, like finance and medicine.

- Policy Optimization

As demonstrated by algorithmic trading, game-playing AI, and recommendation systems, AI systems may optimize rules to maximize expected benefits.

II. METHODOLOGY

An extensive volume of pertinent published data must be found, gathered, and evaluated in a systematic literature review[4] by determining the inclusion and exclusion criteria for the research. This investigation was carried out using the well-known search engines Mendeley and ScienceDirect, which provide high-standard academic publications in terms of both quality and reputation. The field of artificial intelligence is evolving rapidly, with new technologies, applications, and research emerging frequently. By restricting the paper to the last few years, we can better capture the latest advancements and innovations in AI within the banking and finance sector. The data collecting and analysis procedure, which spanned the years 2021 to 2023, consisted of the following five steps:

- Step 1: defining the criteria for inclusion and exclusion (Table 1).

- Step 2: Investigate the research on artificial in banking and finance by looking at Mendeley and Science Direct. In the end, Mendeley and Science Direct both found 36 and 468 journals.

- Step 3: Use the pre-identified key terms to search the chosen marketing publication (see Table 1). As a result, 156 articles in ScienceDirect and 34 in Mendeley were discovered.

- Step 4: By reading the abstract, we may narrow down our search. Thus, for the final analysis, six publications from Science Direct and seven from Mendeley were chosen.

- Step 5: analysis stage for the publications that were retained.

TABLE I.   INCLUSION AND EXCLUSION CRITERIA

Inclusion elements	Exclusion elements
Studies found using keywords "Artificial Intelligence"+ "Banking and Finance" and/or "Artificial Intelligence" only in the title or in the abstract. Peer-reviewed articles published from Mendeley and Emerald Insight Articles written in English.	Non-English publications. Dissertation and conference papers.
The articles should focus on Artificial Intelligence in Banking and Finance with a research range starting from 2021 until 2023 that has open access only. Because the booming AI is in 2020 and become game-changing in the industry.	Older research articles and Non-open access articles.

III. RESULT AND DISCUSSION

As was previously stated, thirteen peer-reviewed journal articles were examined, with the first article being published in 2021.

TABLE II.   FREQUENCY OF ARTICLES BY METHOD AND YEAR

Method	2021	2022	2023	Total
Qualitative		3	2	5
Quantitative		1	2	3
Mixed		1		1
Review	1	1	2	4
Total	**1**	**6**	**6**	**13**

Table 2 shows that most papers were published in 2023 (7) and 2022 (6) in these two databases within marketing Journals. This could be clarified through the recent revolutionization of artificial intelligence, particularly in the banking and financial sectors. In this context, many research papers on artificial intelligence in banking and finance were published during this time period (2022-2023). Another observation in that most studies used qualitative (6) and review (5) methods.

There is an increasing amount from 2021-2023 for those who used the review methodology; this could be explained by the desire to comprehend this new subject related to AI in the marketing industry.

TABLE III.   FREQUENCY OF ARTICLES BY JOURNAL AND YEAR

	2021	2022	2023	Total
Journal of Banking and Finance		1	2	3
International Journal of Information Management	1	1		2
International Conference on Project Management		1		1
European Journal of Operational Research		1		1
International Review of Financial Analysis		1		1
International Conference on Artificial Intelligence in Management and Economics		1	1	2
Journal of Modernization in Engineering Technology and Science			1	1
International Journal of Engineering Technology and Management Sciences			1	1
International Journal of Financial Studies	1			1
Total	**2**	**6**	**5**	**13**

There is an increasing amount from 2021-2023 for those who used the review methodology; this could be explained by the desire to comprehend this new subject related to ai in the marketing industry.

TABLE IV.   FREQUENCY OF ARTICLES BY TOPIC AND YEAR

	2021	2022	2023	Total
AI in banking and finance	1	1	4	6
AI and customer experience		1	2	3
Information management		1		1
FinTech revolution		1	1	2
AI in emerging economies	1			1
Total	**2**	**4**	**7**	**13**

Our analysis yields two key findings. First, AI in banking and other finance, risk, and customer enhancement topics were discussed in the papers that were retained. We observe that four articles omitted mentioning the topic of their research.

We were able to deduce from the findings that marketing publications have covered artificial intelligence in banking and finance less frequently than general management or computer-related journals. The for reviews examined AI as a developing field of research in data science[1], [5], [6], in enhancing customer experience[7].

[1] highlighted uses of data science and AI in risk management, credit scoring, customer insights, fraud detection, algorithmic trading, and other areas to demonstrate the growing significance of these fields in the financial sector, [6] stated that the adaptability of AI is well known, and it possesses superior information-based decision-making skills, [2] explained that there is a high level of knowledge regarding AI technology in banking, [8], [9] showed that artificial intelligence (AI)-based solutions play a crucial role in enhancing efficient risk management, bringing ease, cutting costs, and boosting customers' trust in financial services this statement is supported by [10]–[12] that stated customer service has increasingly benefited from the use of chatbots.

The findings from [13] suggested that using alternative data enables the application of machine learning techniques to evaluate the creditworthiness of those who were previously excluded, enabling them to also receive credit. this is due to the fact that if AI and machine learning are used to alternative data, asymmetries like moral hazard and adverse selection can be addressed. [5], [14] argued that financial inclusion has been made possible by fintech, which has allowed previously unbanked and underserved communities to access financial services.

Efficiency and cost savings are driving AI's advancements in financial applications, and it appears likely to have significant and ongoing benefits for micro problems [15]. According to [16] study, policymakers should focus on enhancing user expectation confirmation, perceived performance, visual attractiveness, communication quality, and corporate reputation, all of which increase satisfaction and increase users' confidence in accepting artificial intelligence-enabled digital banking. Recent research [2] exemplifies the paradigm shift in customer experiences driven by AI. Their study, which surveyed major banking institutions, revealed that AI-powered chatbots have significantly improved customer interactions. These systems, equipped with natural language processing capabilities, offer

personalized assistance, streamline query resolution, and enhance overall customer satisfaction.

IV. CONCLUSION

The most significant drivers of the AI revolution in banking and finance were identified during our research, and this helped advance the literature. A systematic review of the literature revealed that, despite the fact that marketing journals in Mendeley and Science Direct did not sufficiently cover the topic due to research constraints, the banking and finance sector continues to update each year to improve their performance to optimize using AI.

In conclusion, the findings from the reviewed literature from 2020 to 2023 not only contribute to academic discourse but also hold significant practical implications for professionals in the banking and finance sectors. From optimizing customer interactions to fortifying risk management practices and streamlining operational workflows, the adoption of AI technologies emerges as a strategic imperative for financial institutions looking to stay competitive and resilient in an ever-evolving landscape.

As artificial intelligence's popularity grows, a lot of study has been conducted to explain the phenomenon and offer various implementation strategies. For example, important outcomes of artificial intelligence research, including developments in the possible impact of fintech on customer protection, prosperity, price discovery and asset profitability, and the design of digital frameworks in the era of artificial intelligence[17]. This continue to the end of a confirmation about adoption of new technologies and partnership between Fintech companies and banks can enhance financial stability overall while reducing the effects of competition and external disruption[18].

Similar to other industries, financial institutions use artificial intelligence technology for a variety of purposes, including risk management, cybersecurity, service customization, determining creditworthiness, and identifying unusual and fraudulent transactions. By integrating cutting-edge technology into various areas of business, financial institutions, particularly those in the banking industry, can strengthen their connections with customers [19]. Some of the potential benefits of AI implementation in the banking sector are highlighted in the following subsections.

A. Enhanced Customer Experience

AI-powered chatbots and virtual assistants provide 24/7 customer support, addressing queries, assisting with transactions, and offering personalized recommendations. This improves overall customer satisfaction and engagement. The results of correlational and regression analysis from a survey from [7] show that there is a positive relationship between AI and customer experience. Additionally, there is a direct link between AI and after-sales customer support and the provision of personalized customer service. The use of AI in call centre and other after-sales support services will improve customer experience by reducing waiting times.

B. Fraud Detection and Prevention

AI algorithms can analyse vast amounts of data to detect unusual patterns and anomalies, aiding in fraud detection and prevention. Machine learning models learn from historical data to identify potential fraudulent activities and notify the bank or the customer for further investigation. Artificial intelligence (AI) solutions assist banks in proactively preventing fraud and securing consumer accounts by spotting abnormalities and trends suggestive of fraudulent actions [20].

C. Credit Scoring and Risk Assesment

AI algorithms can assess creditworthiness more accurately by analysing a multitude of variables and historical data. This helps banks make better lending decisions, leading to improved risk management. This facilitates easier finance availability and promotes regional economic expansion.

D. Preccess Automation and Efficiency

Automation will be used to replace business-related operations that were previously carried out by humans using scientific and technical concepts[21]. AI automates repetitive and time-consuming tasks, such as data entry, document processing, and account reconciliation. This increases operational efficiency and allows bank employees to focus on higher-value tasks. This is quickly becoming a highly effective way to support banking and financial organizations' ambitions for digital transformation[22].

E. Compliance and Regulatory Reporting

AI helps banks stay compliant with constantly evolving regulatory requirements by automating the monitoring and reporting of transactions, ensuring adherence to legal and compliance standards. Banking regulations are linked to policies that have been put into place, such the Basel Accords, and its major goal is to hold banks to specified standards in terms of their risk mitigation procedures.

F. Data Analysis and Decision Making

The attractiveness of artificial intelligence (AI) is in its innate human-like intellect, which, when correctly harnessed, can considerably accelerate banking procedures, enable personalized client interactions, and stimulate data-driven decision-making[23]. AI can process large volumes of data to generate actionable insights, helping banks make informed decisions regarding investments, customer interactions, risk assessment, and more.

G. Cost Reduction and Efficiency Improvement

Technical efficiency and allocative efficiency are two terms used to describe banks efficiency[9]. Efficiency and operational performance are closely related because efficiency helps banks achieve important objectives like increasing production and cutting costs. By automating processes and improving decision-making, AI can help banks reduce operational costs, streamline workflows, and allocate resources more effectively.

There are obviously some restrictions on this research. The most important ones are dictated by the author's preferences. First, only Data science and marketing journals were included in the search procedure. Future research may take into account other research and a wider range of article categories in light of this. Second, this research is limited to only a study from 2021-2021, future research is suggested to make a longer time period. Future studies could therefore examine the subject by changing the keywords. Finally, we only concentrated on the transformation AI has brought about in finance and banking.

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