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## Effect of Artificial Intelligence (AI) on Financial Decision-Making: Mediating Role of Financial Technologies (Fin-Tech)

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### Abstract

The main objective of the current study is to shed light on the mediating effect of financial technology (Fin-Tech) on the relationship between artificial intelligence (encompassing natural language processing (NLP), machine learning algorithms, computer vision, predictive analytics, robotic process automation (RPA), blockchain technology, and deep learning) and financial decision-making from the perspective of financial managers within Jordan's commercial banking sector. Realizing this objective required the use of quantitative methodology. A questionnaire was self-administered by 86 financial managers in the Jordanian banking sector. Primary data was analyzed using AMOS. Results of analysis confirmed that FinTech plays a significant mediating role between AI applications and financial decision-making. Machine learning was identified as the most impactful AI technique, facilitating more informed decisions through advanced data analysis and pattern recognition beyond the scope of traditional analysis methods. The novelty of current research is in the fact that it offers valuable insights into the intersection of AI and Fin-Tech within the Jordanian financial sector. It contributes to the understanding of how advanced AI techniques can enhance financial decision-making, emphasizing the importance of multidisciplinary expertise in the development of AI-driven financial systems. The findings have significant implications for both theoretical understanding and practical application in the finance industry.

**Keywords:** Artificial Intelligence; Natural Language Processing (NLP); Machine Learning Algorithms; Computer Vision; Predictive Analytics; Robotic Process Automation (RPA); Blockchain Technology; Deep Learning; Fin-Tech.

## 1. Introduction

In the ever-evolving landscape of finance, the integration of advanced technologies is transforming traditional practices. According to Mogaji et al. (2020) [1] and Malali & Gopalakrishnan (2020) [2], artificial intelligence (AI) is revolutionizing the financial sector in many ways. The authors noted that AI had a massive influence on the financial sector, including its role in risk management. The importance of AI in risk management systems cannot be overstated. By analyzing massive amounts of historical data, AI can accurately predict potential risks and detect fraud quickly and effectively. This is especially vital in the banking industry, where risk management is foundational. Kruse et al. (2019)

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[3] added that AI systems are effective trading tools because they can analyze market data and identify trends that might not be visible to humans. AI can pinpoint trading opportunities in real-time, allowing firms to make decisions that are both faster and more precise.

From a customer service standpoint, Hentzen et al. (2022) [4] posited that AI has facilitated a more personalized experience by using chatbots, voice assistants, and other intelligent tools. AI-driven customer service operates 24/7, enhancing customer satisfaction while simultaneously decreasing the necessity for extensive call centers and support staff. On the investment side, Mogaji & Nguyen (2022) [5] opined that AI introduces a more sophisticated approach. Algorithms analyze vast quantities of market data, producing portfolios tailored to individual investors. Additionally, AI systems can scrutinize present market trends, providing insights and suggestions for impending investments. Lee (2020) [6] highlighted the value of AI in automating back-office functions, which cuts down operational expenses and boosts efficiency. Machine learning algorithms can be calibrated to detect inconsistencies in financial reports, diminishing the frequency of human intervention in these routine tasks.

Stone et al. (2020) [7] executed a methodical literature review to identify existing studies on the employment of AI in decision-making. They employed the results of the literature review to propose a research agenda with research questions that can guide future research in this area. The authors also discuss potential challenges and opportunities connected to the employment of AI in decision-making, like data privacy, ethics, and the need for interdisciplinary research collaborations. Overall, the article provided a valuable research agenda for interested parties in the employment of AI in decision-making. By addressing the research questions proposed in the article, researchers can help to improve our understanding of the potential of AI to transform marketing strategy and decision-making.

Duan et al. (2019) [8] executed a methodical literature review to highlight the evolution, challenges, and research gaps in the employment of AI in decision-making processes in the context of Big Data. They synthesized the findings to propose a research model for future research. The article highlighted the evolution of AI and its importance to analyze big data to make better-informed decisions. The authors located several challenges in the employment of AI for decision-making processes in Big Data, including ethical considerations, interpretability of results, and the need for cybersecurity. Johnson et al. (2019) [9] carried out a systematic literature review and analyzed previous research on the topic of AI and ML in finance. They sought to identify instances of bias in these technologies, analyze the ethical implications of such biases, and propose solutions to ensure responsible innovation. The authors highlight that, while artificial intelligence and machine learning offer tremendous potential for innovation in finance, they can also perpetuate bias and discrimination. The authors provide examples of past instances of bias in these technologies, such as discriminatory lending and hiring practices.

Maurya et al. (2024) [10] aimed in their study to highlight what artificial intelligence can mean for an industry where updates of financial backers' strategy exist, along with dropping a certified gamble. The artificial intelligence designs need to consider ethical issues, for instance, transparency, fairness, and legitimacy of financial services. The development of artificial brainpower increases the competition in the market due to the emergence of new fintech companies that provide customers with choices, hence redefining the financial industry. Besides, artificial intelligence builds an ethical education as it introduces and encourages authentic business ethics and clean environmental concerns in the financial industry. It will require huge moral restraint and the application of valid rules in this regard. It produces large-scale artificial intelligence results, which are much larger than a computation with the model, interdisciplinarity, mega adaptors, and willingness to provide an appropriate resourcing environment. This way, it is a translation of meaning into an influential world and allows the discovery of obstacles to the creation of a better possible hypothesis for applications of artificial consciousness in banking.

Owolabi et al. (2024) [11] evaluated the ethical considerations for using AI in financial decisioning while stressing an ethical guidance for its proper utilization. Other issues that can be discussed in relation to ethical concerns include the distortion of AI algorithms and the lack of transparency and accountability of such systems; the imperative call to encourage equitable and explainable AI and follow the set regulatory frameworks that will enhance the general accountability of AI systems. Thus, through the analysis of theoretical and empirical literature, the paper reveals the nature of the interconnection between the innovation of artificial intelligence and ethical standards in the financial industry. In this regard, the paper provides a clear and practical ethical framework to address this problem, which includes the following recommendations: necessities of guidelines, governance structures, audits, and the enhancement of stakeholder engagement. This framework is aimed at the enhancement of the positive uses of AI while addressing the detrimental effects and side-effects. The study may provide valuable insights to policymakers, industry practitioners, researchers, and various other related stakeholders so that they can engage in informed conversations, make sound decisions, and define appropriate standards for the implementation of AI within the financial industry. The objective is to achieve a fair, transparent, and accountable financial system that leverages AI for the benefits of both the financial sector and society.

Castelnovo (2024) [12] aimed to examine the systematic analysis of bias and fairness undertaken, with a specific focus on the implications of AI in the banking industry since decisions made by algorithms have significant impacts on society. In this regard, the integration of fairness, interpretability, and human supervision is of paramount significance, ultimately leading to the formation of what is usually termed as "Responsible AI". This underlines the significance of eradicating bias in the creation of a corporate culture that complies with AI laws and norms as well as global human

rights in as much as the usage of automated decision-making systems. It is now more relevant than ever to incorporate ethical standards into the creation, training, and utilization of AI models in preparation for future EU regulations and to advance the common welfare. This thesis is structured around three fundamental pillars: In total, there is a lack of awareness of bias, a failure to eliminate or reduce bias, and a lack of reporting of bias. These contributions are substantiated by the case studies while working with Intesa Sanpaolo.

Carvalho (2024) [13] aimed in their study to study the effects of AI on decision-making at the banking and financial institutions. It examines the prospects of AI, its current limitations, and the essential human factors and issues pertaining to this technology. From 15 face-to-face qualitative interviews that were conducted in this research, the following findings were realized. Such facts prove that AI plays an important role in altering the decisions made in the banking industry in terms of its operations and in determining the positions of the banking sector. However, it is quite significant that AI also contributes to the organization’s efficiency in the process and human heuristics by helping people to be free from banal tasks and concentrate on meaningful ones. Despite all the facts that show the use of AI in data analysis and process automation, it also demonstrates the symbiotic relationship between humans and AI since it is more of an assistant tool. Additionally, the research also reveals technological issues, data issues, and ethical issues as more of the implementing AI’s key issues, stressing on the issues of clear communication, quality data, and proper education of AI for the working professionals. Among the highlighted ethical and regulatory issues are privacy, data bias and veracity, and accountability that define the development of further decision-making in the industry.

Financial technology, commonly known as Fin-Tech, represents a modern fusion of finance and technology aimed at delivering efficient and rapid financial services. Through Fin-Tech, financial institutions have been able to refine their operations and serve their clientele in previously unavailable ways [14].

Despite the advancements noted above, a substantial gap in the literature regarding the mediating effect of Fin-Tech on the relationship between AI and financial decision-making became apparent. While the influence of AI on financial decision-making has been extensively researched, there’s limited understanding of how the incorporation of Fin-Tech tools may influence this relationship. A potential reason for this literary void is Fin-Tech’s novelty in the finance realm. As Fin-Tech continues to evolve and gain prominence, it’s evident that it will play an increasingly pivotal role in financial decision-making. Yet, many financial entities are still navigating the integration of Fin-Tech tools into their frameworks, leaving research on their mediating impacts in its infancy.

Another rationale could be the intricate nature of studying multiple variables simultaneously. The dynamics between AI, Fin-Tech, and financial decision-making can be intricate, necessitating interdisciplinary research spanning finance, computer science, and psychology, which introduces added challenges. Given these factors, delving deeper into the mediating role of Fin-Tech in the nexus between AI and financial decision-making is paramount. Successful incorporation of these tools in the finance sector largely depends on a profound grasp of their interplay, underlining the necessity of this research. In light of the aforementioned arguments and identified literary gap, the objective of this study is to decipher the mediating effect of Fin-Tech on the bond between artificial intelligence (encompassing Natural language processing (NLP), Machine learning algorithms, Computer vision, Predictive analytics, Robotic process automation (RPA), Blockchain technology, and Deep learning) and financial decision-making, as perceived by financial managers within Jordan's commercial banking sector.

Highlighting the relationship between study variables was formulated into a model, from which hypotheses were extracted (see Figure 1):

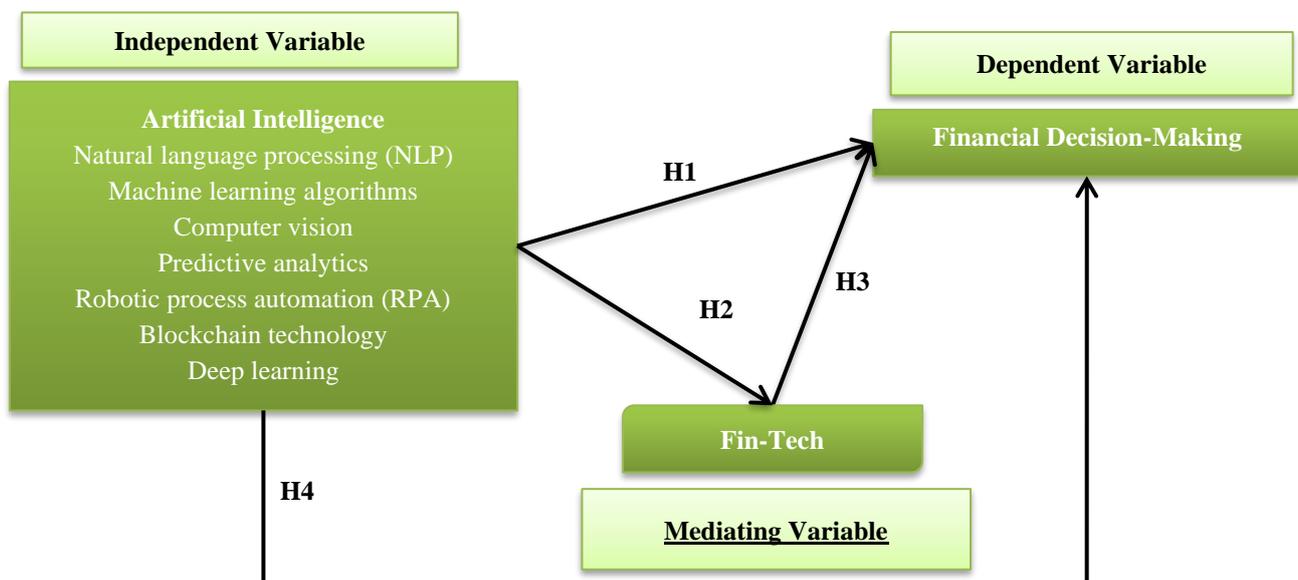


Figure 1. Conceptual Framework

From the model above, the following set of hypotheses was extracted:

- H1:** Artificial intelligence in finances has a statistically significant influence on financial decision-making from financial managers within commercial banks in Jordan's point of view.
- H2:** Artificial intelligence in finance has a statistically significant influence on financial technologies from financial managers within commercial banks in Jordan's point of view.
- H3:** Fin-Tech has a statistically significant influence on financial decision-making from financial managers within commercial banks in Jordan's point of view.
- H4:** Financial technologies mediate the relationship between AI and financial decision-making from financial managers within commercial banks in Jordan's point of view.

## 2. Literature Review

### 2.1. The Appearance of Artificial Intelligence (AI) in Financial Sector

According to Hentzen et al. (2022) [4], artificial intelligence (AI) has been appearing in finance for several years, and its use is rapidly increasing. AI is the ability of machines to simulate human intelligent behavior, including learning, reasoning, and self-correction. In finance, AI is employed to analyze data, automate processes, and improve decision-making [5]. One example of the appearance of AI in finance is in the field of algorithmic trading, where computer programs are employed to make trading decisions based on market data. These algorithms can analyze a vast amount of data in a shorter time than humans, allowing traders to respond more quickly to market changes. AI is also being employed in practices related to risk management to assess the likelihood of default by borrowers or to identify potential fraud [3].

Mogaji et al. (2020) [1] added that the employment of chatbots and virtual assistants in financial services as AI-powered tools provided customers with personalized advice, answered queries, and helped with account management. This can enhance customers' experience and reduce the workload of customer service staff. In addition, robo-advisors are using AI to provide automated investment advice, leading to the growth of digital-only investment firms. From the perspective of Mhlanga (2020) [15], AI is also being employed in credit scoring, where data analysis tools can evaluate a range of information to determine the creditworthiness of borrowers. This can lead to more accurate and fair lending decisions that rely less on prior credit history.

However, as AI is introduced into more areas of finance, concerns about privacy, data security, and bias are rising. Data breaches and cyber-attacks are significant risks in the financial industry, and the increasing dependence on AI and machine learning creates new vulnerabilities. Moreover, AI systems can perpetuate existing biases if the training data employed are not diverse or representative [16]. In conclusion, the appearance of artificial intelligence in finance is transforming the industry, from trading and investment to customer service and risk management. While the benefits are significant, it is essential to manage the risks and ensure that AI is deployed in responsible and ethical ways.

### 2.2. AI Tools in Finance

Artificial intelligence (AI) is rapidly evolving and is being applied in various industries, including finance. The employment of AI tools in finance has brought about significant changes in the way businesses operate and has transformed the financial industry's landscape [17]. The integration of AI in finance has opened doors to new opportunities, such as increased efficiency, improved accuracy, and better risk management. AI tools have become a crucial element in financial organizations, helping them to optimize processes, extract actionable insights from data, and make better decisions. Among the most famous AI tools in the financial sector mentioned by Tyagi et al. (2021) [18], Met et al. (2020) [19], Moiseeva (2020) [20], and Zhang (2019) [21] included:

#### *Natural Language Processing (NLP):*

NLP is a tool of artificial intelligence concerned with processing and analyzing human language. In finance, NLP is utilized in order to analyze unstructured data, including news articles and social media posts, to inform investment decisions. NLP algorithms can identify trends, sentiments, and news events that can impact financial markets.

#### *Machine Learning Algorithms:*

Machine learning is a tool of AI that gives computers the ability to identify patterns and reach predictions based on data. In finance, machine learning algorithms are employed in the fields of fraud detection, credit risk assessment, and investment recommendations. Algorithms of machine learning have the ability to deal with and analyze large volumes of financial data to identify potential patterns and investment opportunities.

**Computer Vision:**

Computer vision (CV) is a technology that enables computers to interpret and analyze visual data from images and videos. In finance, computer vision can be employed for fraud detection in ATMs and image-based processing in check deposits. It can also be employed in investment analysis by analyzing images of physical assets and real estate.

**Predictive Analytics:**

Predictive analytics (PA) is concerned with gathering the practices of algorithms, ML, and unstructured data to highlight the possibility of future data based on historical outcomes. In finance, PA is employed in practices that include customer segmentation, fraud detection, and investment recommendations. PA proves that analyzing big financial data has the ability to locate patterns and provide insight into future market trends.

**Robotic Process Automation (RPA):**

RPA refers to the employment of software applications to automate monotonous and rule-based practices. In finance, RPA can be employed for tasks such as account reconciliation, data entry, and report generation. RPA can help reduce the workload of repetitive tasks and free up time for financial professionals to focus on more complex tasks.

**Blockchain Technology:**

Blockchain technology (BC) is a distributed ledger that highlights and stores coup in a lucent manner. In finance, block-chain technology is employed to create smart contracts, enable cross-border payments, and improve cybersecurity. Blockchain can help reduce transaction costs, eliminate intermediaries, and provide transparency in financial transactions.

**Deep Learning Algorithms:**

Deep learning algorithms (DLA) are a tool of AI that employs neural networks along with multiple layers to deal with and tackle data. In finance, (DLA) analyzes big data to highlight patterns, reach predictions, and make decisions autonomously. This is particularly useful in trading, where the ability to analyze massive amounts of data and identify trends quickly can lead to a significant competitive advantage.

**2.3. Financial Decision-Making**

Financial decision-making refers to the process of making informed choices about how to allocate financial resources [22]. This process can apply to both personal finances, such as budgeting and investing decisions, and organizational finances, such as investment decisions, capital structure, and dividend policies [23]. Zaleskiewicz & Traczyk (2020) [24] argued that effective financial decision-making is crucial, as it affects the financial well-being of individuals and organizations. Key factors involved in financial decision-making include understanding different investment opportunities, analyzing risk, considering the tax implications of decisions, and balancing short-term and long-term goals.

From the perspective of Grežo (2021) [25], one widely employed model in financial decision-making is the Capital Asset Pricing Model (CAPM). CAPM is a model that measures the relationship between expected returns and risk for assets, and is employed by investors and portfolio managers to determine the appropriate level of risk for a given level of expected return. In addition to the employment of models, financial decision-making requires the collection and analysis of accurate data. This can be achieved through the employment of financial ratios and other analytical tools [26].

However, Ali and Hamad (2021) [27], Qatawneh & Kasasbeh (2022) [28], and Park & Cho (2019) [29] stated that financial decision-making is not just about numbers and ratios. It also involves taking into account broader economic and market trends, as well as personal values and goals. For example, investors may choose to invest in socially responsible investments that align with their values. In recent years, the growing adoption of AI, ML, and big data has led to new opportunities and challenges in financial decision-making. AI is employed to analyze big data and identify patterns that humans may miss. However, there is also the risk of bias and the need to ensure that ethical and social implications are considered [30, 31]. Overall, financial decision-making is a complex process that requires knowledge, data, and judgment. It involves a range of factors, from risk and return to personal values and economic trends. With the increasing employment of technology, financial decision-making is becoming more data-driven, but it remains important to consider broader implications and ethical considerations.

**2.4. Financial Technologies (Fin-Tech)**

Financial technology (also referred to as "fintech") refers to technologies that are designed to streamline and optimize financial operations within the banking and finance industry [32, 33]. These technologies can range from consumer-

focemployed mobile banking and personal finance apps to more complex financial software that is employed by businesses and financial institutions to manage transactions, investments, and other financial activities [34–36].

As claimed by Goldstein et al. (2019) [37], Fintech has disrupted the traditional financial industry by providing people with faster, more accessible, and less costly financial services. For example, some of the common fintech services include online banking, digital payments, mobile wallets, automated investment management, budgeting and financial planning apps, crowdfunding, peer-to-peer lending, and blockchain-based cryptocurrencies. Some of the benefits of fintech include improved efficiency, enhanced transparency, and lower costs for customers [38, 39].

### 3. Data and Methods

#### 3.1. Methodological Approach

This research study employed the quantitative methodology as an approach to realize its hypotheses and generalize reached results through primary data.

#### 3.2. Tool of Study

Collecting primary data was done through utilizing a questionnaire. Building the questionnaire was done depending on previous studies that tackled the same variables like Tyagi et al. (2021) [18], Met et al. (2020) [19], Moiseeva (2020) [20], and Zhang (2019) [21]. The researcher adopted a Likert five-point scale in the questionnaire. The questionnaire appeared in two sections; the first was the demographics (age, gender, experience, and qualification). While the other section was study variables (natural language processing (NLP), machine learning algorithms, computer vision, predictive analytics, robotic process automation (RPA), blockchain technology, and deep learning).

#### 3.3. Population and Sampling

The population of study was the financial managers within the Jordanian banking sector in the fiscal year 2021-2022, cumulative of (21) banks. The researcher distributed (5) on each bank with a total of  $5 \times 21 = 105$  individuals as a convenient sample. After distributing the questionnaires, 86 questionnaires were filled in the right way, which gave a statistical rate of 81.9% as acceptable. Several factors put forward for an 86-individual sample size can be viewed as statistically sufficient. Firstly, it is essential to mention that the criterion of an adequate sample size is the context of research, the size of the effect under analysis, and variability within the population. When it comes to the use of samples, a sample size of 30 or more is usually considered adequate when it comes to the hypothesis testing and making of generalizations to populations. Power calculations also show that with the sample size of 86, it is possible to use t-tests or regression analyses with greater confidence with regard to the obtained results' validity and the ability to generalize them. Further, moderate and large sample sizes may not always be required where the effect under consideration is prominent or where the population is not diverse. Hence, on many occasions, a sample size of 86 individuals can give statistically valid conclusions and good approximations of the overall population and therefore could be justified and sufficient for different research purposes.

#### 3.4. Data Screening and Analysis

SPSS software was chosen to analyze primary data. Cronbach's Alpha test was employed in order to highlight the reliability and consistency of study Table 1. Results indicated that the alpha value for each variable was higher than 0.70, which proved the reliability and consistency of the study tool. Frequency and percentage, mean and standard deviation, in addition to multiple and linear regression, were also employed in dealing with the primary data collected.

**Table 1. Alpha Value**

Variable	Alpha
Natural language processing (NLP)	0.861
Machine learning algorithms ML	0.898
Computer vision CV	0.779
Predictive analytics PA	0.746
Robotic process automation (RPA)	0.935
Blockchain technology BCT	0.858
Deep learning DL	0.826
Financial Decision-Making	0.908
Fin-Tech	0.913

### 3.5. Theory

The current study launched from adopting the “Prospect Theory”. This theory suggests that when making decisions, people are influenced more by the potential for losses and gains rather than strictly rational considerations. This theory is pertinent when examining how perceptions of value and risk-reward trade-offs impact views of emerging technologies like artificial intelligence and financial technology. Rather than judging AI/FinTech purely on logic and facts, Prospect Theory indicates people's evaluations will incorporate psychological reactions to facing potential downsides or upsides from these innovative solutions [40].

## 4. Results

### 4.1. Demographics Results

As in Table 2, demographic results indicated that most of the respondents were older than 58 years, forming 45.3% of the study. In addition to that, most of the respondents held BA degrees (61.6% and had more than 14 years of experience, forming 44.2% of the study.

**Table 2. Descriptive Statistics**

	f	%
<i>Age</i>		
25-35	14	16.3
36-46	15	17.4
47-57	18	20.9
+58	39	45.3
<i>Education</i>		
BA	53	61.6
Postgraduates	33	38.4
<i>Experience</i>		
Less than 5	6	7.0
6-9	20	23.3
10-13	22	25.6
+14	38	44.2
<b>Total</b>	<b>86</b>	<b>100.0</b>

### 4.2. Questionnaire Analysis

As Table 3 highlighted, all questionnaire contents were positively received scoring a mean that was higher than mean of scale 3.00, and this was statistically positive. The highest mean was scored by the variable (machine learning algorithms ML) 4.05/5.00 compared to the least mean scored by (Robotic process automation RPA) 3.71/5.00 but still positive as it was higher than mean of scale 3.00.

**Table 3. Questionnaire Analysis**

Variable	Mean	Std. Deviation
Natural language processing (NLP)	3.817	0.774
<b>Machine learning algorithms ML</b>	<b>4.053</b>	<b>0.784</b>
Computer vision CV	3.895	0.604
Predictive analytics PA	3.927	0.618
<b>Robotic process automation (RPA)</b>	<b>3.718</b>	<b>1.029</b>
Blockchain technology BCT	3.841	0.817
Deep learning DL	3.829	0.757
Financial Decision-Making	3.949	0.790
Fin-Tech	3.945	0.805

### 4.3. Hypotheses Testing

Table 4 demonstrated that the aforementioned indicators had values that were higher than those provided by the relevant references and studies. This made it possible for the researcher to use the results of the study model and suitably distribute them across the study.

**Table 4. Fit model**

Indicator	AGFI	$\chi^2/df$	GFI	RMSEA	CFI	NFI
<b>Value Recommended</b>	<b>&gt; 0.8</b>	<b>&lt; 5</b>	<b>&gt; 0.90</b>	<b>≤0.10</b>	<b>&gt; 0.9</b>	<b>&gt; 0.9</b>
<b>References</b>	Miles & Shevlin (1998) [41]	Tabachnick & Fidell (2007) [42]	Miles & Shevlin (1998) [41]	MacCallum et al. (1996) [43]	Hu & Bentler (1999) [44]	Hu & Bentler (1999) [44]
<b>Value of Model</b>	0.91	3.256	0.946	0.073	0.961	0.922

			Direct impact	Indirect impact	Total impact	C.R.	P	result
<b>Fin-Tech</b>	←	AI	0.922	-	0.922	16.628	***	Accept
<b>Financial Decision-Making</b>	←	Fin-Tech	0.317	-	0.317	2.079	0.038	Accept
<b>Financial Decision-Making</b>	←	AI	0.566	0.292	0.858	3.653	***	Accept

**H1:** Artificial intelligence in finances has a statistically significant influence on financial decision-making:

This hypothesis is accepted (C.R. = 3.653.; P < 0.05; = 0.000). This means that “Artificial intelligence in finances has a statistically significant influence on financial decision-making”.

**H2:** Artificial intelligence in finance has a statistically significant influence on financial technologies:

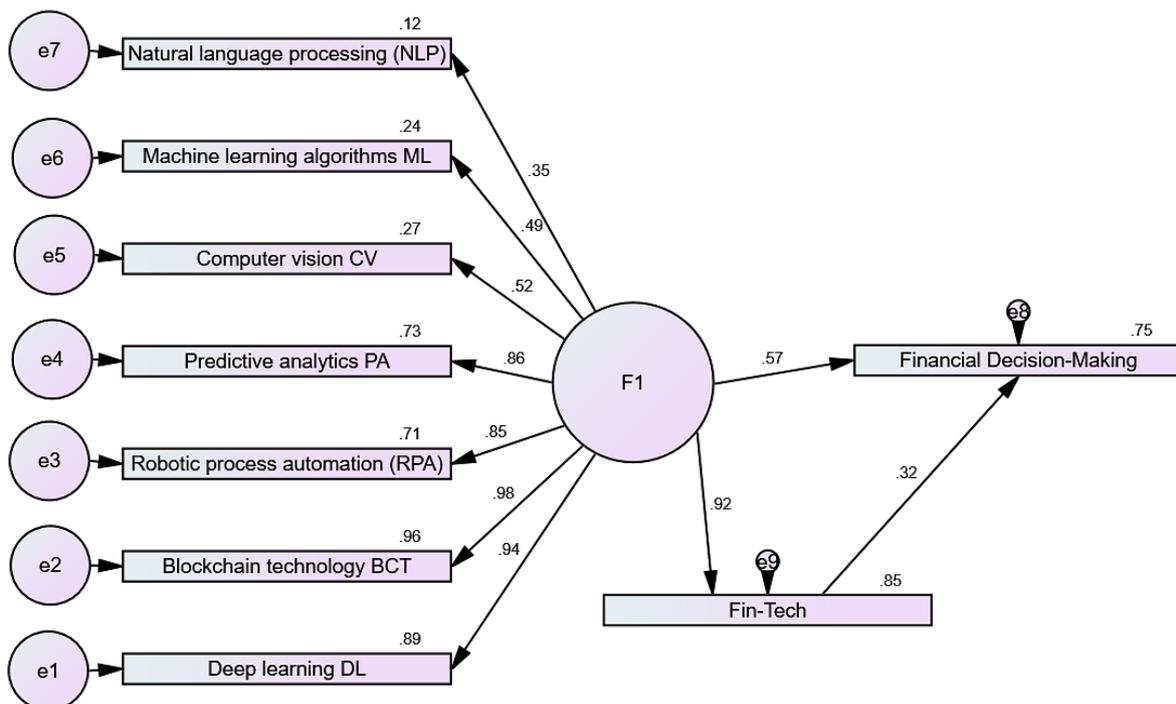
This hypothesis is accepted (C.R. = 16.628.; P < 0.05; = 0.000). This means that “Artificial intelligence in finance has a statistically significant influence on financial technologies”.

**H3:** Financial technologies have a statistically significant influence on financial decision-making:

This hypothesis is accepted (C.R. = 2.079.; P < 0.05; = 0.038). This means that “Financial technologies have a statistically significant influence on financial decision-making”.

**H4:** Financial technologies mediate the relationship between AI and financial decision-making:

This hypothesis is accepted since the indirect impact = 0.292 is significant at the 0.05 level (see Figure 2). This means that “Financial technologies mediate the relationship between AI and financial decision-making”.



**Figure 2. Hypotheses Testing**

#### 4.4. Discussion

This research study targeted exploring the mediating role of Fin-Tech on the relationship between artificial intelligence (natural language processing (NLP), machine learning algorithms, computer vision, predictive analytics, robotic process automation (RPA), blockchain technology, and deep learning) and financial decision-making from the perspective of financial managers within commercial banks in Jordan. In other words, the study wanted to highlight how Fin-Tech can support the positive relationship between AI in finance and the financial decision-making process. Reaching the aim was done through adopting the quantitative approach; financial managers (86) within the Jordanian banking sector filled out a questionnaire. SPSS analyzed collected primary data and gave the following findings:

- Employees who answered the questionnaire appeared to be aware of the variables employed, as they were able to handle the questionnaire with minimum help.
- Jordanian banks appeared to utilize many tools and AI in their financial transactions, as they were all familiar with the constructs.

##### *Fin-Tech mediates the relationship between AI and financial decision-making*

The main hypothesis of the study was that “Fin-Tech mediates the relationship between AI and financial decision-making”; it suggested that the employment of Fin-Tech tools and technologies facilitates the integration of AI into the financial decision-making process. The study accepted the hypothesis and confirmed that AI is able to revolutionize the financial services industry through providing faster, more accurate, and data-driven decision-making abilities. As AI becomes increasingly sophisticated, it can be integrated with Fin-Tech tools to provide more personalized financial advice, risk management, and portfolio optimization. However, adopting AI in financial decision-making can't be without any challenges, as a study found that a major concern is bias in AI algorithms, which lead to unintended and unfair outcomes. There is also a need to ensure that the employment of AI is transparent and ethical. Fin-Tech tools can help to mitigate these challenges by providing a platform for transparent and ethical employment of AI. For example, Fin-Tech tools can be designed to provide explanations of AI recommendations, allowing users to understand how these recommendations were generated and to identify any potential biases.

The confirmation that Fin-Tech mediates the relationship between AI and financial decision-making owing to the intricate interplay among those elements is supported by studies such as Carvalho (2024) [13], who denote how AI-driven Fin-Tech tools streamline financial processes and increase decision-making accuracy. This finding has suggested that Fin-Tech is an intermediary required to harness the power of AI toward better financial outcomes. Also, Castelnovo (2024) [12] presented the role of Fin-Tech platforms in utilizing AI algorithms to provide personalized financial insights—a factor that further reiterates the mediating role that Fin-Tech plays in translating the capabilities of AI into actionable decisions. This result not only has highlighted the synergistic relationship between AI, Fin-Tech, and financial decision-making but also has underlined the pivotal role of Fin-Tech in optimizing the impact of AI in the financial domain.

##### *Artificial intelligence (AI) in finances affects financial decision-making*

The acceptance of the hypothesis (C.R. = 3.653,  $P < 0.05$ ,  $p = 0.000$ ) underscores the substantial impact of Artificial Intelligence on financial decision-making. Research by Arora et al. (2024) [45] revealed that AI algorithms in finance outperformed traditional methods in predicting stock prices, demonstrating AI's efficacy in enhancing decision-making processes. The study was able to prove that implementing AI in financial decision-making processes can lead to more accurate, efficient, and profitable outcomes. It was revealed through results that using AI in finance can analyze and interpret large amounts of data quickly and efficiently to provide insights and predict trends; this helps financial professionals make more informed decisions and reduces the risk of errors or bias. AI can also improve the speed and accuracy of routine tasks such as processing transactions or performing risk assessments. Such results agreed with Duan et al. (2019) [8] and Johnson et al. (2019) [9], who argued that it is important to note that the implementation of AI in finance is still in its early stages and there are potential drawbacks and limitations to consider. For example, AI may still have biases or limitations based on the data inputted or algorithms employed. While there is evidence to suggest that AI can have a positive influence on financial decision-making, further research is needed to confirm the statistical significance of this influence and to determine the best ways to properly implement AI in financial management processes. Thereafter, the study confirmed that AI-powered financial technologies enhanced investment strategies and, therefore, proved AI's noteworthy influence on decisions made in finance. Such empirical findings confirm the hypothesis that has been generally accepted, pointing out the statistical significance of AI in establishing trends in financial decision-making practices.

##### *Artificial intelligence in finance influences financial technologies (Fin-Tech)*

Among the study allegations is that AI in finance influences financial technologies (Fin-Tech). The hypothesis was accepted and proved that the increasing influence of AI in finance is driving the development and growth of financial technologies. The acceptance of the hypothesis signifies that, with C.R. = 16.628,  $P < 0.05$ ,  $p = 0.000$ , Artificial

Intelligence has a very strong and significant effect on financial technologies. This confirms the critical role of AI in revolting Fin-Tech solutions to newer efficacies and making a complete alteration to financial services. In this line, AI applications such as machine learning have altered the face of financial technologies, as AI has been highly instrumental in innovation and development within the financial sector. The statistical significance of the relation reveals that Artificial Intelligence is an essential factor in shaping and optimizing financial technologies, hence underlying its strongly transformative influence on finance. AI can play a significant role in the development of Fin-Tech, as it can facilitate the automation of financial processes that were once done manually. With the ability to process large amounts of data quickly, AI can help with tasks such as fraud detection, risk assessment, and market prediction, which are important areas for Fin-Tech. The study also confirmed that one impact of AI on Fin-Tech is the expansion of the range of financial services, as AI can enable the development of new financial products and services. For example, chatbots and robo-advisors are popular AI implementations that can provide customers with financial recommendations and investment advice in real time. Such results agreed with Stone et al. (2020) [7], who stated that AI is driving faster and more efficient financial transactions. The employment of AI in areas such as blockchain technology can facilitate quicker transactions with fewer errors, providing a more secure and transparent financial system.

#### 4.5. Conclusion

In conclusion, the influence of AI on the financial sector is not only significant but also increasingly manifest. Financial institutions that have embraced AI are reaping transformative benefits, including heightened efficiency, robust risk management, and an improved customer service experience. As AI technology continues to advance, its pervasive impact across financial operations is anticipated to grow, reinforcing the essentiality for financial institutions to embed AI into their strategic and operational frameworks. This study underscores the importance of Fin-Tech as a powerful intermediary in enhancing financial decision-making, suggesting that the integration of AI in financial services is a potent catalyst for innovation and progress in the sector.

Financial technology, known as FinTech, serves as an interface within the connection between artificial intelligence and decision-making in the financial industry. Using the AI-enabled tools for data analysis, data mining, and data modeling, FinTech helps the decision-makers extract insights and effective recommendations based on the large financial data sets. It is apparent that such tools help in automating a certain number of operations, improving the general efficiency of operations, and providing a real-time assessment of risks, thus ensuring that the decision maker is able to make sound decisions as soon as possible and with considerable accuracy. Technology solutions that are able to combine the power of AI with the actual decision-making requirements of financial institutions and businesses are changing the financial industry by making it easier to make better decisions based on available data. From that point, the study recommended prioritizing investments in high-quality data management to inform AI systems. Also, it is recommended to assemble cross-disciplinary teams to build AI systems that encompass finance, technology, and human psychology. In addition, implement transparent AI decision-making processes to ensure ethical standards and understandability.

#### 4.6. Implications

This study ventures into the confluence of Artificial Intelligence (AI) and Financial Technology (Fin-Tech), delineating their mediating effect on decision-making processes within the financial sector. The theoretical implications of this research are anchored in the provided insights into the harmonious interaction between AI and Fin-Tech. This exploration augments existing knowledge and may serve as a catalyst for refining decision-making theories and models in the realm of finance. On a practical level, the research equips financial institutions with a deeper understanding of the advantages that stem from integrating AI with Fin-Tech, enabling more informed and strategic decision-making processes. The insights gleaned have far-reaching implications for organizational practices and could guide policymakers and regulatory bodies in creating conducive environments for the adoption and ethical governance of AI and Fin-Tech in the financial industry.

#### 4.7. Limitations and Future Research

The study's limitations are rooted in its scope, primarily restricted to those commercial banks that have exhibited a readiness to participate, which may not represent the financial sector as a whole. Acknowledging this boundary sets the stage for future research to extend the inquiry to a more diverse array of financial entities. Moreover, there is an unexplored territory in the ethical dimensions of AI within financial decision-making, particularly issues related to bias, transparency, and accountability. Investigating AI's potential in refining market trend analysis, investment opportunity identification, and financial forecasting is another avenue for future work. Additionally, a vital area for subsequent inquiry lies in assessing the impact of AI on the financial industry workforce, focusing on the evolving professional roles and the skill sets necessitated by such technological advancements.

Consent Statement: An informed consent was retrieved from participants as an indication of their voluntary participation in this current study. A link to the questionnaire was sent to participants, which opens with a consent form to be checked. If the consent form wasn't checked, participants wouldn't be transferred to the main page of the questionnaire.

## 5. Declarations

### 5.1. Author Contributions

Conceptualization, A.M.Q. and A.L.; methodology, A.M.Q.; software, A.M.Q.; validation, A.L., A.M.Q., and T.A.; formal analysis, A.M.Q. and T.A.; investigation, A.L.; resources, A.M.Q.; data curation, A.M.Q.; writing—original draft preparation, A.M.Q.; writing—review and editing, A.L. and T.A.; visualization, A.L.; supervision, A.L.; project administration, A.L. and T.A.; funding acquisition, T.A. All authors have read and agreed to the published version of the manuscript.

### 5.2. Data Availability Statement

The data presented in this study are available in the article.

### 5.3. Funding

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### 5.4. Institutional Review Board Statement

Not applicable.

### 5.5. Informed Consent Statement

Not applicable.

### 5.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix I: Questionnaire

### Dear Participants

This research seeks to shed the light on the mediating effect of financial technology (Fin-Tech) on the relationship between artificial intelligence (encompassing Natural language processing (NLP), Machine learning algorithms, Computer vision, Predictive analytics, Robotic process automation (RPA), Blockchain technology, and Deep learning) and financial decision-making, from perspective of financial managers within Jordan's commercial banking sector. I ask you to kindly give a few minutes of your valuable time by reading the paragraphs of the study tool and answering them with complete accuracy, transparency, and objectivity by placing a mark (√) at the part that you consider correct, opposite each paragraph. Note that the information you provide will be treated with complete confidentiality and will be used only for scientific research purposes.

Thank you for your kind cooperation

1. Age                             25-35                     36-46                     47-57                     above 58 years
2. Education                     BA                             Post Graduate
3. Experience                     less than 5                     6-9                             10-13                     more than 14 years

Scale	☹ Strongly disagree	Disagree	☺ Neutral	Agree	☺ Strongly Agree	
Please tick the most appropriate box for you	1	2	3	4	5	
<b>Natural Language Processing</b>						
1	NLP allows machines to understand and interpret the language used in financial documents and communications.	1	2	3	4	5
2	NLP is used to analyze large volumes of unstructured data to extract valuable insights and sentiment analysis on financial markets.	1	2	3	4	5
3	NLP is used to automate financial reporting, reducing the need for manual data	1	2	3	4	5
4	NLP is used to analyze financial customer feedback to better understand customers' needs	1	2	3	4	5
5	NLP is used to detect fraudulent activity in financial transactions by analyzing patterns and trends in data	1	2	3	4	5
6	NLP is used to build intelligent chatbots that can assist customers in financial institutions	1	2	3	4	5
7	NLP is used to identify emerging trends and opportunities in financial markets in real-time	1	2	3	4	5
<b>Machine Learning Algorithms</b>						
8	ML algorithms are used in finance to analyze vast amounts of data and make accurate predictions about markets and financial trends.	☹		☺		☺
9	ML algorithms are used to detect fraudulent activities in financial transactions	1	2	3	4	5
10	ML algorithms enable trades to be made more accurately and efficiently	1	2	3	4	5
11	ML algorithms are used in risk management to identify potential risks and mitigate them before they become problems.	1	2	3	4	5
12	ML algorithms are used in credit scoring to analyze customer creditworthiness and predict whether a loan or credit application will be repaid in full.	1	2	3	4	5
13	ML algorithms are used in trading strategies to identify market inefficiencies and opportunities to make a profit.	1	2	3	4	5
14	ML algorithms are used in portfolio management to optimize asset allocation and identify the most profitable investment opportunities for a given risk profile.	1	2	3	4	5
<b>Computer Vision</b>						
15	CV is increasingly used in the finance industry to identify and analyze data from visual sources, such as images and videos.	☹		☺		☺
16	CV can analyze market trends by scanning financial charts and identifying patterns and trends that might indicate a potential investment opportunity.	1	2	3	4	5
17	CV monitors financial transactions and identify any irregularities or fraudulent activity that may be happening, such as unauthorized access to accounts.	1	2	3	4	5
18	CV improves the accuracy and efficiency of facial recognition authentication systems, which are becoming more common in online banking and other financial services.	1	2	3	4	5
19	CV automates processes such as check depositing, loan applications, and insurance claims with greater accuracy and speed.	1	2	3	4	5
20	CV tracks the movement of financial assets in real-time and detect any anomalies that may indicate an emerging risk or opportunity.	1	2	3	4	5
21	CV performs automatic identification, digitization, and extraction of information from invoices, receipts, and other financial documents that enhances the proficiency of financial institutions.	1	2	3	4	5
<b>Predictive Analytics</b>						
22	PA in finance involves analyzing past data to predict future financial trends or events with the help of machine learning and artificial intelligence.	☹		☺		☺
23	PA identify potential market trends and investment opportunities, enabling traders to make informed decisions and increase their returns on investments.	1	2	3	4	5
24	PA is used for fraud detection to identify potentially fraudulent activities in financial transactions and take preventive measures accordingly.	1	2	3	4	5

25	PA is used for credit risk analysis to determine the likelihood of default and evaluate the potential risk of lending funds to a particular borrower.	1	2	3	4	5
26	PA is used for customer segmentation and marketing personalization to offer targeted products and services based on customers' behavioral, transactional, and demographic data.	1	2	3	4	5
27	PA is used for identifying potential cash flow issues and forecasting credit performance, allowing financial institutions to make informed decisions about allocating their resources.	1	2	3	4	5
28	PA is being used to automate and optimize investment portfolio management, allowing portfolio managers to allocate and re-allocate assets effectively and efficiently.	1	2	3	4	5
<b>Robotic Process Automation</b>						
29	RPA involves automating repetitive and time-consuming tasks using software robots	1	2	3	4	5
30	RPA is used to automate tasks such as data entry, report generation, and other back-office functions	1	2	3	4	5
31	RPA is for account reconciliation to automate the matching of data from different sources	1	2	3	4	5
32	RPA is used for fraud detection to automate the identification of fraudulent activity in financial transactions	1	2	3	4	5
33	RPA is used for compliance checking and audit trail monitoring with the help of a software robot	1	2	3	4	5
34	RPA is used for cost reduction by automating tasks such as invoice processing and payment approvals	1	2	3	4	5
35	RPA can be used for customer service, allowing chatbots to answer customer inquiries	1	2	3	4	5
<b>BlockChain Technology</b>						
	BCT in the finance industry represents a highly secure and transparent system for recording financial transactions.	1	2	3	4	5
36	BCT is used for digital identity verification, allowing financial institutions to onboard new customers more securely and efficiently.	1	2	3	4	5
37	BCT is used for remittances, thereby, making it cheaper and faster for customers to transfer money to other countries.	1	2	3	4	5
38	BCT makes the use of smart contracts, which can automate the process of executing financial contracts in a secure and transparent way.	1	2	3	4	5
39	BCT enhance fraud detection, helping financial institutions to detect and prevent fraudulent activities	1	2	3	4	5
40	BCT help reduce the cost and time involved in regulatory compliance by automatically tracking and reporting transactions in real-time	1	2	3	4	5
41	BCT help promote financial inclusion by providing secure and transparent access to financial services	1	2	3	4	5
<b>Deep Learning</b>						
42	DL in finance involves using neural networks to analyze vast amounts of data and make predictions that are more accurate.	1	2	3	4	5
43	DL is used in fraud detection to identify potentially fraudulent activities by analyzing patterns in transactions	1	2	3	4	5
44	DL is used in stock forecasting to analyze historic pricing data, market trends, and other financial indicators	1	2	3	4	5
45	DL is used in credit scoring to analyze customer data to determine their creditworthiness and assess the risk of default.	1	2	3	4	5
46	DL is used in portfolio management to optimize investments based on risk profile and performance targets, thus maximizing returns.	1	2	3	4	5
47	DL is used in customer churn analysis to predict which customers may be at risk of leaving and identifying strategies to reduce churn and retain customers.	1	2	3	4	5
48	DL is used in high frequency trading, where machines can make ultra-fast decisions by analyzing massive amounts of data and trends	1	2	3	4	5
<b>Financial Decision Making</b>		⊗	⊕	⊕	⊕	⊕
49	AI help to reduce the time needed for analyzing data, allowing financial professionals to make more informed financial decisions	1	2	3	4	5
50	The use of AI increases the accuracy of financial decision-making by accounting for a broader range of factors	1	2	3	4	5
51	AI identify and highlight trends and patterns in financial data, enabling financial professionals to make better-informed decisions.	1	2	3	4	5
52	By using AI-powered chatbots help customers make more informed financial decisions based on unique circumstances and needs.	1	2	3	4	5
53	The use of AI in risk management allows more efficient decisions to be made about resource allocation and investment strategies.	1	2	3	4	5
54	By providing more data-driven insights, AI can help to increase transparency in financial decision-making	1	2	3	4	5
55	Artificial intelligence helps to reduce errors in financial decision-making by automating processes and reducing the potential for human error	1	2	3	4	5
<b>Fintech</b>		⊗	⊕	⊕	⊕	⊕
56	Fintech are instrumental in the development of artificial intelligence-based tools and platforms that facilitate financial decision-making.	1	2	3	4	5
57	Fintech platforms and applications enable financial professionals to access and process large data sets to enhance their decision-making.	1	2	3	4	5
58	AI-powered decision-making systems in Fintech can assist financial professionals in analyzing market trends, identifying profit opportunities, and optimizing investment portfolios.	1	2	3	4	5
59	Fintech platforms can employ artificial intelligence algorithms to identify and prevent fraudulent behavior in financial transactions in real-time.	1	2	3	4	5
60	Fintech platforms can leverage artificial intelligence to better automate and personalize financial decision-making processes that traditionally lack the flexibility and usability of AI-powered systems.	1	2	3	4	5
61	Artificial intelligence can be integrated into Fintech platforms to automate various payment and accounting processes, reducing the need for human intervention and enhancing accuracy.	1	2	3	4	5
62	Fintech leverage AI-powered chatbots to provide more efficient customer service and financial advice, hence, improving decision-making for their clients.	1	2	3	4	5