



Opportunities and Challenges of Integrating Financial Technology and Artificial Intelligence in Enhancing Financial Management Between the Theoretical Framework and the Practical Reality

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Abstract. This study aims to clarify the conceptual and practical framework of the use of financial technology (FinTech) and artificial intelligence (AI), and to ex-amine their contribution to improving financial management (FM) and en-hancing the performance of the business sector. The study adopts a deduc-tive methodology by addressing the following research question: What is the current state of adopting financial technology and artificial intelligence to improve the performance of financial management in economic enterprises within the Algerian environment? The study is based on a questionnaire ad-ministered to a sample of 76 individuals from 14 small and medium-sized economic enterprises operating in the provinces of El Oued and Ouargla in 2025. The findings reveal a high level of awareness of the advantages and benefits derived from the applications of financial technology and artificial intelligence. However, these enterprises exhibit a low level of the necessary prerequisites for adopting such applications, in addition to facing a number of challenges with a noticeable impact.

Keywords: Financial Technology, Artificial Intelligence, Financial Management, Business sector.

1 Introduction

Financial technology or “FinTech” refers to the application of technology to traditional financial services to make them more efficient and accessible. FinTech adoption has grown rapidly in recent years, driven by technological advancements and increasing demand for financial services. This growth has been fueled by the rising number of people with access to smart phones and the internet, as well as the development of new technologies such as blockchain and cloud computing [1][2][3]. Artificial intelligence (AI), on the other hand, is a branch of computer science that deals

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with creating machines capable of performing tasks that typically require human intelligence. AI has been used in a wide range of industries, including finance, and is now increasingly integrated into financial services. AI is used to automate tasks, make better investment decisions, and improve the overall customer experience [4][5][6].

The integration of FinTech and AI in financial and business sectors has led to advancements in enterprise management, opening up vast opportunities to improve operational efficiency and support decision-making. Enterprises can use FinTech solutions to accelerate payments, process transactions accurately, and reduce costs traditional procedures. AI has enabled companies to analyze amounts of data in real time, allowing for effective forecasting financial trends and risk assessment. Furthermore, this integration has contributed to improving quality financial services to customers and enhancing enterprise's oversight capabilities. Despite these promising opportunities, implementation of these technologies presents challenges related to cybersecurity, need to upgrade technological infrastructure, and development of human resource skills to keep pace with this evolution [7][8][9][10][11].

In light of the growing importance of digital transformation, this study addresses the central research problem:

What is the current state of financial technology and artificial intelligence adoption in improving financial management within the Algerian context?

In order to investigate the problematic issues, the following hypotheses are proposed as tentative answers to be tested subsequently:

- Managers of economic enterprises are not aware of the advantages and benefits of adopting FinTech and AI in financial management ;
- Economic enterprises do not possess the necessary infrastructure and resources to adopt FinTech and AI in financial management ;
- Economic enterprises do not face challenges affecting the implementation of FinTech and AI in financial management.

This study aims to review the concepts of FinTech and AI in financial management (FM), assess the capacity of enterprises to implement technologies and conditions to adopt, its benefits, and identify capabilities and challenges in their application. Utilizing a deductive methodology, it examines theories laws relevant to these variables in the context of Algeria, thereby addressing a research gap by exploring digital transformation (DT) in an environment different from that used in studies (Algeria).

2 Theoretical background

2.1 Conceptual Framework of Artificial Intelligence

Artificial intelligence (AI) is a growing field that involves the development of computer systems performing tasks that typically require human intelligence, such as visual perception, speech recognition, and decision-making. AI has the potential to revolutionize industries and has a significant impact on our daily lives [12]. AI systems are designed to perform specific tasks using algorithms and mathematical models that enable them to make decisions [13]. There are different types of AI systems, including rule-based systems, expert systems, and machine learning algorithms. The

latter has seen significant growth in recent years and has been used to develop highly sophisticated AI systems and improve their performance over time [14].

The field of AI has existed for several decades, but it has experienced significant growth in recent years due advancements in computing power and availability of amounts of data. The emergence of AI can be traced back to development of computer systems in 1950s and 1960s, which paved the way for development advanced AI systems in subsequent decades. The widespread adoption of the internet and mobile devices has had a major impact on its growth, as it has provided access enormous amounts data that can train AI systems [15]. AI has had a significant impact aspects society. In finance, AI detect fraud, analyze financial data, predict market trends. In transportation, AI improve efficiency safety of autonomous vehicles, while in manufacturing, AI optimize production processes enhance product quality [16].

Although AI has the potential to deliver significant benefits, it also raises important ethical and social questions. For example, widespread AI raises concerns about job losses and privacy due to the personal data it collects and processes [17]. The future of AI is uncertain, but it is expected to continue rapid growth and have a significant impact on society. It becomes increasingly complex and integrated into daily lives, leading to innovative solutions across various industries. However, it is crucial that the ethical and social implications of AI are carefully considered and addressed as it continues to evolve. Therefore, developing will require collaboration among computer scientists, engineers, and experts in ethics and social sciences to ensure that the benefits of AI are realized while minimizing harms [18].

2.2 Financial Technology overview

Financial technology, also known as FinTech, refers to the application of technology in the delivery of financial services [19]. The term FinTech is a broad one, encompassing a wide range of financial services delivered through technology. These services can range from mobile banking and online investment management to peer-to-peer lending and digital currencies [20]. The goal of FinTech is to make financial services more accessible, efficient, and affordable for consumers and businesses. FinTech leverages cutting-edge technologies such as artificial intelligence, big data, and blockchain to create innovative solutions [21].

The emergence of FinTech in form can be traced back to the 2008 global financial crisis, which led to a loss of confidence in traditional financial enterprises and opened the door market entrants. With the widespread adoption of mobile devices as smartphones, consumers can access financial services on the go, demand digital financial solutions [22]. The growing availability of cloud computing, big data, other technological advancements has fueled the growth of the FinTech industry [23]. Therefore, it can be argued that the advent of FinTech has led to changes in the financial industry, resulting in rapid growth. This field continues to evolve, offering innovative solutions financial transactions investments [24].

FinTech plays a progressively vital role in the modern world through its broad range of practical applications [25]. These applications span several key areas within enter
prises: [26] [27] [28]

- **Electronic Payments Management:** This includes the use of digital payment systems such as e-wallets, mobile payments, and instant transfers, which contribute to reducing costs, accelerating transactions, and improving cash flow.
- **Treasury and Cash Flow Management:** FinTech solutions enable real-time monitoring of cash flows, liquidity forecasting, and improved investment and short-term financing decisions.
- **Digital Accounting and Smart Financial Systems:** FinTech-based accounting systems allow for the automation of accounting entries, real-time financial reporting, and a reduction in human error.
- **Alternative Financing:** Including crowdfunding platforms and peer-to-peer lending, which provide flexible financing sources, especially SMEs.
- **Financial Risk Management:** Big data analytics and AI tools are used to more accurately assess credit risk, liquidity risk, and market risk.
- **Fraud Detection and Compliance:** FinTech applications help monitor transactions, detect suspicious activity, and ensure compliance with regulatory and tax standards.
- **Financial Customer Relationship Management:** FinTech contributes to the personalization of financial services, improves customer experience, and enhances loyalty through behavioral analytics.

The future of FinTech is expected to involve continued rapid growth, transforming the financial industry through AI, machine learning, big data, and blockchain technologies. These innovations enhance access to financial services, improve transaction efficiency, reduce costs, and offer new solutions for consumers and businesses, demonstrating the transformative power of technology [30].

2.3 Impact of Fintech and AI on the Financial and Business Sectors

FinTech and AI integration in financial and business sectors has been widely studied [31]. This section addresses it from the following perspectives:

- **Innovation Theory:** The integration of fintech and AI can be considered a form of technological innovation in the financial and business sectors. According to Schumpeter's theory of innovation, new technologies and ways of doing things can lead to economic growth and progress. In the case of fintech and AI, these technologies have the potential to disrupt the traditional financial services industry, leading to increased efficiency and improved customer experience [32].
- **Entrepreneurial Theory:** The integration of fintech and AI can also be considered a form of entrepreneurship in the financial and business sectors. According to Baumol's theory of entrepreneurship, entrepreneurs can identify opportunities for innovation and create new products and services that meet customer needs. In the case of fintech and AI, startups and other entrepreneurial ventures have identified the opportunity to use these technologies to improve financial services and create new products and services that meet customer needs [33].

Combining innovation and entrepreneurship theories provides a framework for understanding integration of fintech and AI in financial and business sectors. It highlights opportunities technologies offer, as well as challenges need to be addressed [33].

3 Materials and Methods

This section will present the methods used for data collection and related aspects, as well as the statistical techniques employed to process the data.

3.1 Data Collection / Population and Sample

A questionnaire based on a five-point Likert scale was used for data collection. It was distributed electronically and in paper form to department heads, officials, and administrative staff from enterprises in El Oued and Ouargla, yielding 76 valid responses.

3.2 Validity and Reliability

- **Validity** was confirmed through internal consistency using Pearson’s correlation, which ranged from 0.538 to 0.856 and were statistically significant ($p < 0.05$) (table 1)

Table 1. Correlation between each item and the overall axis.

Axis	Items	1	2	3	4	5	6
01	Cor.co*	0.732	0.845	0.754	0.782	0.663	/
	p-Value	0.000	0.000	0.000	0.000	0.000	/
02	Cor.co*	0.713	0.641	0.856	0.687	0.721	0.689
	p-Value	0.000	0.000	0.000	0.000	0.000	0.000
03	Cor.co*	0.698	0.811	0.654	0.692	0.754	0.538
	p-Value	0.000	0.000	0.000	0.000	0.000	0.000

* Cor.co=correlation coefficient

Source: Authors’ own work

- **Reliability** was assessed using Cronbach’s Alpha, with coefficients ranging from 0.709 to 0.793, indicating acceptable reliability and consistency of the responses.
- **Normality Test:** It was performed using the Kolmogorov-Smirnov test to determine the type of statistical analysis that can be used (table 2).

Table 2. The reliability and Normality test results.

Axis	Items	Reliability	Validity	Asymp. Sig	Decision
01	05	0.741	0.861	0.17	Normal
02	06	0.709	0.842	0.24	Normal
03	06	0.793	0.891	0.08	Normal
Total	17	/	/	0.19	Normal

Source: Authors’ own work

All axes follow a normal distribution; therefore, we can follow the parametric testing method.

4 Result

4.1 Demographics and practice characteristics

Table 3 indicates that most respondents held a bachelor's degree (42.68%), and the largest proportion (36.84%) had more than 15 years of experience, indicating that the sample is sufficiently experienced.

Table 3. Participant demographics.

Position			Qualification			Experience		
Chara.*	N	%	Chara.	N	%	Chara.	N	%
Department Head	18	26.87	Bachelor's	36	47.37	0-5	09	11.84
Administrative Worker	58	86.57	Master's	28	36.84	6-10	19	25.00
	/	/	Other	12	15.79	11-15	20	26.32
	/	/	/	/	/	Over 15	28	36.84

Chara. Characteristics

Source: Authors' own work

4.2 Awareness of the advantages of adopting FinTech and AI in the FM

Table 4 shows high mean scores (overall mean = 3.95) with low dispersion (SD = 0.70). The Student's t-test was significant ($p < 0.05$), confirming the statistical significance of the results and their generalizability to the study population.

Table 4. Respondents' perceptions regarding awareness of the advantages of adopting FT, AI, and FM

Items	Indicators		Importance
	Mean	S. D	
The use of FinTech contributes to accelerating financial processes within an enterprise.	3.89	0.601	High
AI helps improve the accuracy of financial forecasts and enables more effective decision-making.	4.02	0.744	High
Adopting digital systems reduces human error in processing financial data and reports.	3.71	0.698	High
FinTech enhances the transparency of financial operations and makes them easier to track and monitor.	3.93	0.601	High
The total items of the first axis	3.954	0.725	High
	Sig T	0.000	

Source: Authors' own work

4.3 Availability of the necessary elements for adopting FinTech and AI in FM

Table 5 shows moderate mean scores (overall mean = 3.04) with relatively low dispersion (SD = 0.98). The Student's t-test was significant ($p < 0.05$), confirming the statistical significance of the results and their generalizability to the study population.

Table 5. The opinions of the sample regarding the various items of the second axis.

Items	Indicators		Importance
	Mean	S. D	
The enterprise provides a digital infrastructure that enables the efficient use of FinTech systems.	3.41	0.938	Moderate
The enterprise has sufficient financial resources to invest in AI applications in the financial sector.	3.54	0.754	Moderate
The enterprise has a skilled workforce capable of working with modern digital systems.	3.43	0.809	Moderate
The enterprise adopts policies that support the DT of FM.	2.98	0.877	Moderate
It has modern financial information systems that support integration with FinTech and AI applications.	3.25	0.929	Moderate
The enterprise is committed to providing employee training programs on the use of digital tools in financial operations.	3.61	1.145	Moderate
The total items of the second axis	3.04	0.989	Moderate
	Sig T	0.000	

Source: Authors' own work

4.4 Challenges hindering the adoption of FinTech and AI in FM

The table 6 indicates high mean scores (overall mean = 4.37) with low dispersion (SD = 0.79). The Student's t-test was significant ($p < 0.05$), confirming the statistical significance of the results and their generalizability to the study population.

Table 6. The opinions of the sample regarding the various statements of the third axis.

Items	Indicators		Importance
	Mean	S. D	
Financial obstacles hinder the implementation of fintech (it requires high costs that outweigh the expected benefits).	4.81	0.918	High
There is insufficient awareness among senior management regarding the advantages and benefits of fintech and AI.	4.15	0.755	High
There is apprehension about adopting modern management methods that differ from the current approach used in your enterprise.	4.56	0.840	High
Your enterprise lacks qualified personnel with managerial and academic expertise in the field of fintech and AI.	4.03	0.769	High
Digitalized management systems require a stable internet connection, which may not always be available to customers.	4.14	0.904	High
Security is a concern regarding the use of modern technologies in the administrative field.	4.73	0.911	High
The total items of the third axis	4.37	0.79	High
	Sig T	0.000	

Source: Authors' own work

5 Discussion

In this study, the first hypothesis being rejected. This was based on the results of table 5, where most of the statements were within the category of high relative importance, and the overall score for the axis was statistically significant. This indicates that there is a high level of awareness among managers of economic enterprises regarding the advantages that can be achieved through adopting FinTech and AI in FM.

The second hypothesis was also rejected. This rejection was supported by the results in table 6, where all statements fall within the category of moderate relative importance. Furthermore, the overall score for this axis is statistically significant, indicating that the enterprises under study possess the minimum conditions necessary for implementing financial technology and AI in FM.

The third hypothesis was rejected as well, through the results of table 7, as all of its statements were within the category of high relative importance, and the overall score for this axis is statistically significant. This indicates that there is a high level of challenges with a noticeable impact related to the application of FinTech and AI in FM, and therefore enterprises have a lot of work ahead of them to implement this aspect.

6 Conclusion

This study, from a theoretical perspective, sheds light on the concept of FinTech as a modern manifestation of digital transformation and its potential contribution to supporting the management of economic enterprises and developing their various interests and functions. AI is also a rapidly growing field that has already had a significant impact on enterprises and society. While AI has the potential to deliver substantial benefits, it also raises important ethical and social questions that must be carefully considered. The future of AI is uncertain, but its rapid growth is expected to continue, significantly impacting enterprises. Developing AI will require collaboration among computer scientists, engineers, and experts in ethics and social sciences to ensure that its benefits are realized while minimizing its potential harms.

The field study conducted on a sample of financial enterprises operating in the provinces of El Oued and Ouargla allowed us to assess the practical application of FinTech, determine its feasibility for use by these enterprises, identify the advantages and benefits gained from its adoption, and pinpoint the challenges hindering its implementation. In light of the findings, the most important conclusions can be summarized as follows:

There is a high level of awareness among managers of economic enterprises re-

garding the advantages can be achieved by adopting FinTech as a means to improve efficiency and effectiveness in their operations and functions, especially the financial function. Moreover, these enterprises under study possess the minimum requirements necessary to implement these financial technologies and AI systems as a means to improve their management and, consequently, their competitiveness and market positioning. However, this is countered by a very high level of challenges with a significant impact related to the application of these financial technologies. Therefore, these enterprises have a lot of work ahead of them to implement this approach.

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