










“The impact of financial technology on bank performance in Arabian countries”

AUTHORS

Laith Al-Shouha 

Ohoud Khasawneh 

Shahir El-qawaqneh 
Ahmad A. Al-Naimi 
Mohammed Saram 

Wan Nur Syahida Wan Ismail 

ARTICLE INFO

Laith Al-Shouha, Ohoud Khasawneh, Shahir El-qawaqneh, Ahmad A. Al-Naimi, Mohammed Saram and Wan Nur Syahida Wan Ismail (2024). The impact of financial technology on bank performance in Arabian countries. *Banks and Bank Systems*, 19(2), 234-244. doi:[10.21511/bbs.19\(2\).2024.19](https://doi.org/10.21511/bbs.19(2).2024.19)

DOI [http://dx.doi.org/10.21511/bbs.19\(2\).2024.19](http://dx.doi.org/10.21511/bbs.19(2).2024.19)

RELEASED ON Friday, 28 June 2024

RECEIVED ON Wednesday, 28 February 2024

ACCEPTED ON Wednesday, 05 June 2024

LICENSE



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

JOURNAL "Banks and Bank Systems"

ISSN PRINT 1816-7403

ISSN ONLINE 1991-7074

PUBLISHER LLC “Consulting Publishing Company “Business Perspectives”

FOUNDER LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

48



NUMBER OF FIGURES

1



NUMBER OF TABLES

4

© The author(s) 2024. This publication is an open access article.



BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Received on: 28th of February, 2024

Accepted on: 5th of June, 2024

Published on: 28th of June, 2024

© Laith Al-Shouha, Ohoud Khasawneh, Shaher El-gawagneh, Ahmad A. Al-Naimi, Mohammed Saram, Wan Nur Syahida Wan Ismail, 2024

Laith Al-Shouha, Ph.D., Assistant Professor of Finance, Royal Jordanian Air Force Technical University College for Aviation Sciences; Amman Arab University, Jordan. (Corresponding author)

Ohoud Khasawneh, Ph.D., Associate Professor of Finance, Faculty of Business, Department of Finance, Amman Arab University, Jordan.

Shahir El-qawaqneh, Ph.D., Assistant Professor, Jadara University, Jordan.

Ahmad A. Al-Naimi, Ph.D., Associate Professor, Department of Finance and Banking Sciences, Faculty of Business, Applied Science Private University, Jordan.

Mohammed Saram, Academic Chair, School of Business Administration, Canadian College Kuwait, Kuwait.

Wan Nur Syahida Wan Ismail, Ph.D., Assistant Professor, Faculty of Business, Economics and Social Development, University Malaysia Terengganu, Malaysia.



This is an Open Access article, distributed under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted re-use, distribution, and reproduction in any medium, provided the original work is properly cited.

Conflict of interest statement:

Author(s) reported no conflict of interest

Laith Al-Shouha (Jordan), Ohoud Khasawneh (Jordan), Shaher El-gawagneh (Jordan), Ahmad A. Al-Naimi (Jordan), Mohammed Saram (Kuwait), Wan Nur Syahida Wan Ismail (Malaysia)

THE IMPACT OF FINANCIAL TECHNOLOGY ON BANK PERFORMANCE IN ARABIAN COUNTRIES

Abstract

Banking operations have always evolved in tandem with developing technologies in all fields, providing new services to customers and facilitating easier banking transactions. Many banks have adopted modern financial technology, which has immensely impacted their financial performance, often linked to their operation markets and client bases. This study aims to examine the relationship between financial technology and bank performance using panel data for 21 Arabian banks, from Bahrain, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, from 2015 to 2022. Financial technology was determined by the frequency with which digitalization terminology appeared in annual reports. Bank performance is measured by return on assets and return on equity. Ordinary least squares and two-stage least squares were applied to achieve the objective. The findings reveal that financial technology positively impacts the return on assets for Arabian banks, where a one-unit increase in fintech causes a 0.37 increase in ROA. In addition, financial technology positively impacts return on equity for Arabian banks, where a one-unit increase in fintech leads to a 0.29 increase in ROE. To confirm the study results, robustness was examined for the regression results using sub-period analysis before and during COVID-19. The results obtained using the two sub-periods show that financial technology positively impacts banks' financial performance in the two sub-periods before and during COVID-19. In addition, financial technology's impact on financial performance in model 1 and model 2 during COVID-19 (0.78 and 0.47) is higher than its impact before COVID-19 (0.49 and 28).

Keywords

fintech, financial performance, Arabian commercial banks, return on assets, return on equity

JEL Classification

G21, N25

INTRODUCTION

The 21st century has witnessed a major revolution in innovation and technology, driven by the revolution in artificial intelligence and digital technology in the financial markets, which has led to significant and noticeable changes in banking and financial transactions (Mbunge et al., 2022). Financial technology is based on employing all the technological and digital tools available to develop and enhance the performance of banks and financial firms through improving and developing financial services and automating them, as technology affects all sectors, especially banks and financial services companies (Faik et al., 2020). The beginnings of fintech included the use of computers on desks in banks, financial institutions, and commercial companies, but the concept has evolved to encompass new technologies like the Internet of Things, big data, and blockchain, used to build banking business models and services and make decisions regarding business activities and investments (Song et al., 2021).

Banks have invested large sums in fintech to build foundations and infrastructure for it, in addition to setting and developing digital strategies (Sefried & Riepe, 2023). Innovations that appeared in the financial sector helped accelerate the expansion of commercial operations on the Internet. Technological giants formed a strong and major motive for digitizing banking services, improving interactions between banks and customers in addition to maximizing revenues. Financial technology is employed in the services and activities provided by banks and the transactions completed for customers. The practical outcomes of such activities affect the future of banking services, including online banking services and the facilitation of decision-making (Asongu, 2018).

Fintech investment in the digital transformation of traditional activities by purchasing expensive hardware and software solutions aims to improve service offerings and operational efficiency, seeking to save time and effort for stakeholders. In this context, Arab countries have been keen to invest in rapid and successive developments in various fields, especially regarding technology in the banking sector. The exponential growth in this field over recent decades provides financial and investment returns that help support and stimulate economic growth. Recently, companies specializing in fintech have emerged that provide new innovations and effective solutions that enable the Arab banking sector to develop and improve the performance and quality of services provided. However, the effects of applying financial technology in Arab banks have not gotten their due attention in literature; as pointed out by Zarrouk et al. (2021), more research is needed to explore financial technology's practical impacts on performance in the region.

1. LITERATURE REVIEW

Financial technology is an innovation in financial services, operations, and procedures provided to customers by banks. It is used in conjunction with technological development and artificial intelligence to ensure the quality and efficiency of financial services and systems, increase effectiveness, and achieve customer satisfaction.

The success of organizations is related to customer satisfaction and loyalty through improving the services provided and quality (Schindler, 2017; Thakor, 2020). In this context, researchers indicated that technological development improves services in the banking sector, especially those related to financial technology, which affects their level of performance (Hua et al., 2019). This, in turn, increases sales, enhances customer loyalty, and improves its relationship with them. This contributes to improving a bank's image and gaining a competitive advantage. It can be said that the banking sector is widely interested in investing in financial technology and providing services and products based on fintech to meet customer demands necessary for growth, sustainability, and profits.

Developments in financial technology have led to significant changes and transformations in the

banking sector (Zhao et al., 2022). Banks compete to obtain a competitive advantage over each other by entering the digital world, employing big data, blockchain, and artificial intelligence platforms, and forming partnerships with companies that offer financial technology products.

Financial technology is defined as the various modern technologies applied in the financial sectors (Darolles, 2016). Digitization is defined as advanced technologies (business models, new applications, and processes) that help to provide high-quality and competitive financial services and financial stability (Chhaidar et al., 2022). Banks work on continuity innovations to develop and improve their work mechanisms to gain a competitive advantage in the markets, as they promote digitization mechanisms that facilitate banking services and support their operations (Zhao et al., 2022).

There were many theories that dealt with digital transformation and the importance of a bank's performance. One of these theories indicates that digital transformation helps banks to outperform their counterparts from traditional banks and gives them a competitive advantage by developing and improving partnerships with specialists in big data and artificial intelligence (Wang et al., 2021). In the same context, an additional theory indi-

cates that digital transformation contributes to improving and enhancing the efficiency of banks and their systems, in addition to reducing costs such as the costs of operations and commercial activities and making them more efficient (Theiri & Alareeni, 2023).

In another context, one of the theories indicates that investments in digital tools in banks, like internet security, digital platforms, and payment systems, contribute to improving bank profitability (Chen et al., 2021). In addition, according to originality theory, digital transformation indicates the importance of establishing a digital infrastructure to form a new banking structure that helps provide costs and a competitive advantage that improves financial performance (Gong & Ribiere, 2021).

The theory of financial intermediation indicates that the cost of information, transactions, and uncertainty play an essential role in financial intermediation. The shift towards digitalization in financial operations and the use of technology in financial operations helped increase the ability to identify the target segment of customers, as well as reduce the time spent solving customer problems and increase their participation in development. (Chen et al., 2019). Therefore, the involvement of banks in applying financial technology reduced transaction costs. In the same context, the spread of electronic payment operations through mobile applications helped reduce bank branches and employee numbers in conjunction with improving these services, thus making banks more effective.

Banks are aware of the importance of their customer experience and its impact on profitability. Digital banking services, financial technology, and the continuation of providing and developing technological financial products and their increasing use by customers are important to ensure banks' competitiveness (Thakor, 2020). Thus, it can be said that the impact of investing in financial technology on banks and customers is very important.

It can be said that digital transformation facilitates communication with customers by providing attractive windows that reduce costs compared to the volume of customers dealing with them. In addition to that, it helps in improving control over the performance of banks and thus

helps in improving the profitability of banks. Despite the various literature related to fintech and banks' performance, the Arabian countries are still under investigation in this area. The current study is considered one of the first studies to address this issue in Arabian countries using a sample of 21 commercial banks in seven Arabic countries.

2. FINANCIAL TECHNOLOGY AND BANK PERFORMANCE

Theories emphasize the importance of information technology in enhancing bank performance, as indicated by the transaction cost theory. To maximize banks' profit, additional efforts must be made (increased transaction costs) to reduce these costs, valuable skills must be acquired, and advanced integration implemented (Williamson, 1985). Thus, it can be said that technology helps increase profits without the need to increase the size of a bank and its employees; rather, this can be achieved by reducing the size of the bank.

In the context of agency theory, it can be said that investment in financial technology improves control over administrative actions, thus reducing opportunistic behavior and agency problems. This has a positive impact on bank performance. Technology facilitates the process of obtaining information, reduces the costs of analyzing it, and facilitates management activities and decision-making, which affects the bank's performance (Kenneth & Jane, 2009).

In the beginning, the studies focused on staff costs and how they can contribute to the profitability of banks; as Molyneux and Thornton (1992) indicated, the number of employees influences a bank's profitability through the establishment of new branches. However, the personnel costs reduce the bank's financial performance. In this context, Angbazo (1997) referred to the idea of optimal use of costs. Digital transformation and the application of financial technology strategies may require significant training, maintenance, and updates, but they reduce the number of employees and costs, in addition to a decrease in bank branches, which contributes to improving bank profitability (Ky et al., 2021; Louati & Hadoussa, 2021).

Digitization and financial technology include the continuation of activities in the long term, the provision of services after official working hours, the spread of banking services, and the ease of access to them. Therefore, the optimal use of these services helps enhance banks' profitability (Giatsidis et al., 2019). Digital transformation and financial technology can be considered tools to rationalize bank expenditures, operational expenses, costs, or overheads (Cao et al., 2022). This rationalization serves as a basis for improving banks' profitability and financial performance, as risks can be controlled. Cheng and Qu (2020) indicated that investing in financial technology reduces credit risk, and therefore it is an important tool for improving bank profitability. Financial technology also improves the services provided, in addition to providing a better perception of customer requirements and increasing the growth of banks and sustainable development (Luo et al., 2022). Fintech applications affect banking sustainability (Kriebel & Debener, 2019).

Through financial technology, it is possible to enhance and develop business models and procedures in banks, reduce their operating expenses, in addition to its important role in improving credit risk management models, efficiency and effectiveness of services provided, and focus on customers (Bouri et al., 2020; Wang et al., 2021). Thus, this indicates the importance of banks investing in financial technology. In this context, it can be said that financial technology improves bank profitability (Rega, 2017; Bashayreh & Wadi, 2021). Financial technology helps to create specific systems to implement work mechanisms, transaction techniques, and innovative services based on developing technologies and providing financial services faster and more efficiently. Fintech helps to facilitate the transfer of information and speed up its processing, in addition to reducing costs and ensuring continuous improvement in bank transactions such as borrowing (Liberti & Peterson, 2019). Fintech plays a vital and important role in assessing the risks to which the bank is exposed by providing high-accuracy information in a very short time (Hauswald & Marquez, 2003).

Using digital banking services reduces operational costs and improves a bank's profitability. Therefore, banks invest in artificial intelligence

and modern financial technology tools. In this context, many studies dealt with the relationship between financial technology and financial performance. Campanella et al. (2017) indicated that three components of financial technology improve European banks' profitability. In addition, Rega (2017) showed that digital investments enhance the European banks' profitability. Moreover, Dadoukis et al. (2021) indicated the importance of information technology for banks during the Corona pandemic period. Also, Chhaidar et al. (2022) found that banks' profitability was affected positively by investment in financial technology.

Therefore, it can be said that financial technology helps banks improve the quality of information necessary for investment, in addition to reducing risks and the number of employees needed to complete transactions. This helps speed up transactions and improve bank profitability. Therefore, it can be hypothesized that

H1: Financial technology has a positive effect on Arabian commercial banks' financial performance.

3. METHODOLOGY

3.1. Model

This study aimed to investigate the influence of financial technology on bank performance in Arabian countries. To accomplish this objective, various variables were employed, as outlined in equations (1) and (2).

$$ROA_{it} = \beta_0 + \beta_1 FINTECH_{it} + \beta_2 SOLV_{it} + \beta_3 CAR_{it} + \beta_4 SIZ_{it} + \beta_5 INF_{it} + \beta_6 GDP + u_{it}, \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1 FINTECH_{it} + \beta_2 SOLV_{it} + \beta_3 CAR_{it} + \beta_4 SIZ_{it} + \beta_5 INF_{it} + \beta_6 GDP + u_{it}, \quad (2)$$

where *Return on assets (ROA)*: Dividing the banks' net income by total assets. This ratio is commonly used as a proxy for banks' financial performance. *Return on equity (ROE)*: Dividing the banks' net income by owner equity. This ratio is commonly used as a proxy for banks' financial performance. *Financial technology (FINTECH)*: It was deter-

mined by the frequency with which digitalization terminology appeared in annual reports. *Solvency ratio (SOLV)*: Measured by dividing total equity by total assets. *Capital adequacy ratio (CAR)*: Measured by Tier1 + Tier2 risk-weighted assets. *Size (SIZ)*: Calculated using the logarithm of total assets. *Gross domestic product (GDP)*: Proxies as the annual growth rate of GDP (%). *Inflation rate (INF)*: Annual rate of GDP (Abdelaziz et al., 2022).

Kriebel and Debener (2019) used this method to generate the DIG score for digitalization engagement. The metric utilized in this study assesses the level of involvement with digitalization by examining the frequency of specific digitalization-related terms in annual reports. The researchers have defined a set of words, “digital,” “mobile,” “Internet,” “cyber,” “fintech,” “crowdfunding,” “blockchain,” “big data,” “hack,” “social media,” “artificial intelligence,” “AI,” “robotic,” “online,” “information technology,” “information system,” “computing,” “programming,” and “computer science,” which were used as search criteria for this metric.

3.2. Data and sample selection

Data were gathered from 21 commercial banks located in seven different Arab countries: Jordan, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (all of which are recognized as leading countries in digital transfor-

mation according to the Arab Digital Economy Index). Three banks were selected from each country with the highest rankings in the Banker Index. The time frame for the collection of data was from 2015 to 2022. The time period chosen for the study was determined by available data for the samples.

To assess the interest of countries (study sample) in investing in fintech, the five most frequent keywords in the measure of fintech were identified: *digital*, *mobile*, *cyber*, *online*, and *information technology*. They are represented graphically for the countries studied. Figure 1 shows that banks in the UAE, Qatar, and Saudi Arabia are the most invested in fintech. This makes sense, given that these nations encourage technological advancement and innovation to foster an environment conducive to economic competition (Ács et al., 2020). However, most banks in Arab countries are close to average in investing in fintech. Figure 1 shows the five most frequent keywords on the Fintech scale in commercial banks in Arabian countries

4. RESULTS

4.1. Descriptive analysis

Descriptive statistics for the study variables are shown in Table 1, indicating that the average ROA is 1.2, which is considered a good ratio in the

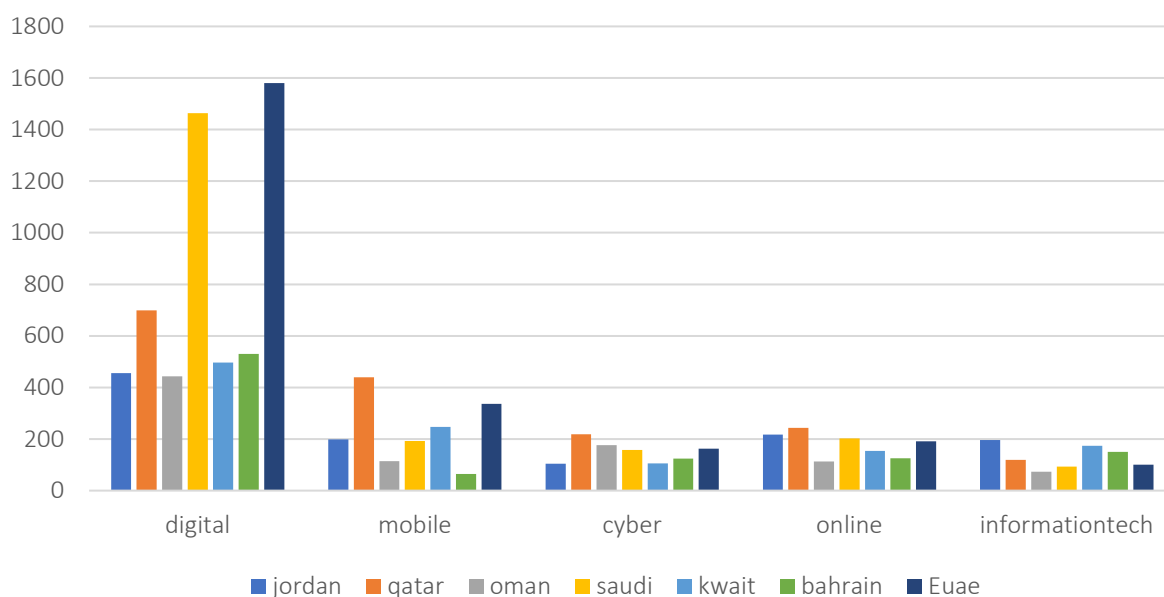


Figure 1. The most frequent keywords on the Fintech scale in commercial banks in Arabian countries

banking field, and most of the values were positive (Chhaidar et al., 2022). With regard to the ROE, the average was 5.4, and most of the results were positive (and therefore good). The results related to fintech show that the average was 0.001, while the results ranged between 0.05 and 0.007. This indicates banks' commitment to applying fintech and providing and facilitating their services for their clients. The capital adequacy ratio indicates that Arab banks are committed to maintaining values of capital adequacy to bear and absorb the loss in capital, where the lowest value was 13.3.

Table 1. Descriptive analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	168	1.2	0.64	-0.9	2.72
ROE	168	9.98	5.4	-11.4	21.8
FINTCH	168	0.001	0.007	0.0007	0.05
SOLV	168	13.5	2.6	1.69	18.4
CAR	168	17.7	2.24	13.3	27.3
SIZ	168	10.6	0.71	7.43	12.0
INF	168	1.46	1.8	-2.54	4.99
GDP	168	1.7	3.3	-8.8	8.7

4.2. Correlation matrix

According to Table 2, the values are important in determining the extent of the multicollinearity problem between the study variables. Yoshikawa and Phan (2003) indicated that the values should be less than 0.8. The correlation values are all less than 0.8; therefore, there is no multicollinearity problem.

Table 2. Correlation matrix

Variable	ROA	ROE	FINTCH	EA	CAD	SIZ
ROA	1.00	-	-	-	-	-
ROE	0.91	1.00	-	-	-	-
FINTCH	0.03	0.04	1.00	-	-	-
EA	0.13	-0.10	-0.11	1.00	-	-
CAD	0.16	0.09	0.17	0.26	1.00	-
SIZ	0.16	0.21	0.45	-0.08	0.11	1.00

4.3. Multiple regression analysis

The current study employed multiple regression analysis to investigate the study's objective, which is to explore the effect of financial technology on the financial performance of Arabian commercial banks. Diagnostic tests were undertaken; the Wooldridge test was used to check autocorrelation, and the Wald test was modified to expose heteroscedasticity. Alhababsah (2019) suggested using robust standard error for study models suffering heteroscedasticity. The Hausman test was applied to compare the fixed effect model and the random effect model. In addition, 2SLS was applied to ensure the results' reliability and that there is no homogeneity.

Table 3 shows the results of the multiple regression analysis. The first model refers to the connection between return on assets and financial technology, and the results of FEM with robust standard error showed that the components of the model explain 53% of the change in return

Table 3. Regression test results (2015–2022)

Variables	ROA				ROE			
	FEM with robust standard error		2SLS		FEM with robust standard error		2SLS	
	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat
Fintech	0.73	2.6**	0.07	2.2**	0.29	3.06***	0.8	4.8***
Solv	0.08	1.2	0.008	0.98	-0.12	-1.55	-0.004	-0.04
CAR	0.04	3.05***	0.12	3.2***	0.06	1.1	0.09	0.42
SIZ	-0.009	-0.29	0.05	0.13	-0.29	-0.86	-0.14	-0.78
INF	-0.02	-4.3***	-0.38	-1.8**	-0.73	-2.8**	-0.8	-2.75***
GDP	0.06	1.5**	0.05	2.3**	0.23	4.3***	0.06	2.2**
_CONS	0.4	0.89	0.53	2.13**	0.2	1.23	0.78	2.56**
R sq	53%		33%		42%		22%	
Prob (F-statistic)	0.00		0.00		0.00		0.00	
Obs	168		147		168		147	

Note: *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

on assets. The table shows that the relationship between Fintech and ROA is significant and positive (Coef 0.37, t-Stat 2.6**). This means that every change by one unit in Fintech, whether by rise or reduction, keeping other factors constant, has a corresponding impact of 0.37 on ROA in the same direction. The results obtained from 2SLS supported what was reached in FEM with robust standard error, where the relationship between FINTECH and ROA was significant and positive.

The second model refers to the relationship between return on equity and financial technology. The results of FEM with robust standard error showed that the components of the second model explain 42% of the change in return on equity. According to Table 3, the relationship between Fintech and return on equity is significant and positive (Coef 0.29, t-Stat 3.06***). This means that every change by one unit in Fintech, whether by rise or reduction, keeping other factors constant, has a corresponding impact of 0.29 on ROE in the same direction. The results obtained from 2SLS supported what was reached in FEM with robust standard error, where FINTECH has a significant and positive impact on ROE.

4.4. Sensitivity analysis

In this part, the study period was divided into two subperiods: 2015 to 2019 (before COVID-19) and 2019 to 2022 (during COVID-19). The rational reason for this division is the disturbances resulting from the COVID-19 pandemic. Table 4 shows the regression results for two subsamples.

Table 4 shows that the financial performance of banks (ROA and ROE) is positively associated with financial technology in the two sub-periods (before and during COVID-19) and in both models. However, the effect of financial technology on financial performance during the COVID-19 period is higher than its impact in the period before COVID-19. It can be noted that in the first model, the coefficient of financial technology during the COVID-19 period (0.78) is greater than in the period before COVID-19 (0.49) and that the level of significance for the impact of financial technology during the COVID-19 period is greater than the period before COVID-19. This also applies to the second model, where the coefficient of financial technology during COVID-19 (0.47) is greater than in the period before COVID-19 (0.28), and the level of significance for the impact of financial technology during the COVID-19 period is greater than in the period before COVID-19. Therefore, the outputs from Tables 3 and 4 confirmed that the outputs using two subperiods are similar to the full period, where the connection between financial technology and financial performance for Arabian commercial banks is positive.

5. DISCUSSION

The results obtained show that fintech positively affects the FP of Arabian banks. Investing in modern technologies and adopting digital financial strategies improved their FP. This means that as more banks engage in investing in fintech, their profitability will be greater, affirming the findings of previous studies on banks in different markets

Table 4. Regression test results (2015–2019 and 2020–2022)

Variables	Before COVID-19 (2015–2019)				During COVID-19 (2020–2022)			
	ROA		ROE		ROA		ROE	
	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat
Fintech	0.49	3.26**	0.28	2.32**	0.78	4.2**	0.47	3.38**
Solv	0.019	0.8	0.05	0.24	0.1	1.82*	0.24	1.41
CAR	0.07	3.6**	0.12	2.1**	0.98	1.23*	0.64	2.25**
SIZ	0.071	3.0**	0.60	1.79*	0.8	2.0*	0.11	2.1*
INF	-0.04	-2.1**	-0.5	3.1**	-0.2	1.2*	-0.47	-3.2***
GDP	0.02	1.9**	0.15	2.3**	0.007	1.2	0.13	1.8*
_CONS	0.52	1.03	0.17	3.2**	1.2	0.29	0.12	2.09*
R sq	79		77		77		85	
Prob (F-statistic)	0.00		0.00		0.00		0.00	
Obs.	105		105		63		63	

Note: *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

(Cho & Chen, 2021; Daragmeh et al., 2021; Kou et al., 2021; Ruel et al., 2021; Theiri & Alareeni, 2023; Tunay et al., 2019). The transfer towards digitization and fintech represents the modernization and innovation of services, improving their quality and flexibility, which in turn maximizes and generates profits. In another context, it can be said that fintech gives banks a competitive advantage, in addition to cooperation with other emerging companies in electronic payment and the modernization of work tools that help ensure effective and optimal use of bank assets.

Simply put, investing in fintech reduces costs, which in turn increases profits. Based on the transactions and agency theories, investing in fintech helps mitigate costs such as monitoring, transaction, and agency costs. In addition, it provides reliable information and reduces information asymmetry, improving banks' FP. Previous studies indicated that fintech helps minimize the

costs incurred in obtaining information (Liberti & Peterson, 2019).

In the same context, digitization improves credit risk management, increasing bank profitability (Campanella et al., 2017). Banking services based on fintech improve banks' efficiency, decrease operational costs, and progress profitability (Dong et al., 2020). Technological banking activities, including robotics, have improved efficiency and enhanced profitability and general FP (Villar & Khan, 2021).

Thus, the development of the banking industry and its fintech helped improve the FP of Arab banks by increasing the productivity of employees in banks due to the automation of operations, lower costs compared to completed operations, and the creation of business models that attract customers.

CONCLUSION

This study was conducted to investigate the connection between financial technology and Arabian commercial banks' performance. According to empirical results, financial technology has a significant and positive impact on financial performance for the studied period (2015 to 2022) according to ROA and ROE, and the results are similar for each of these financial performance indicators.

During the past few years, the financial technology industry has constituted a revolution in the financial system, whether at the global or Arab level, where banks and financial companies have comparative capabilities in providing digital-based financial services such as money transfers, payment services, investment portfolio management, borrowing, which have revolutionized the paradigm of traditional financial services, and the legacy services that underpin traditional banks (such as high street branches). Therefore, banks are concerned with adopting digital technology and artificial intelligence in their transactions and services provided to customers. This requires financial sector institutions to partner with technology companies to improve and develop infrastructure technology to increase productivity and obtain a competitive advantage. The expansion in technology adoption shows the importance of having legislation and policies that supervise, monitor, and govern the rapid development of digital finance and financial technology-based business models in all their forms. The legislation and policies contribute to reducing the risks resulting from these technologies, especially since they are still emerging and need continuous and strict supervision, especially to ensure that we are not exposed to electronic fraud, to ensure growth opportunities, and to provide a safe investment environment and a competitive economic environment based on integrity and stability.

The results proved that the financial technology of Arab banks positively affects their financial performance. The results of the current study provide new evidence for the literature in this field, especially in the Arab region, where it was found that there is a high development in financial technology in the banking industry, reflecting concerted efforts to improve the services provided to customers and to re-

duce costs while enhancing financial performance.

This study has important policy implications by demonstrating the important role of financial technology in banks' financial performance. The findings suggest expanding investment in this field and digital transformation, setting policies, and encouraging banks at the industrial and regulatory levels to mediate the financial technology transition. Banking associations, central banks, and policymakers in Arab countries must acknowledge the important role of financial technology in reducing costs and improving the quality of services provided, particularly given its impressive performance during the COVID-19 crisis. On the other hand, policymakers should set laws and instructions that regulate this field of investment in banks to ensure customer protection, especially since digital and technological transformation entails risks that can potentially be catastrophic, and which often deter customers from using new and innovative services. Therefore, all parties should pay great attention to financial technology in banks, and public relations opportunities should be explored to explain and popularize the use of products among consumers.

Due to the importance of this topic, this study recommends investigating the effects of financial technology in the banking sector at the local level and examining the factors that influence financial technology adoption. In addition, the study recommends comparing the effects of digital transformation in the banking industry between emerging and developed countries.

AUTHOR CONTRIBUTIONS

Conceptualization: Laith Al-Shouha, Ohoud Khasawneh, Shaher El-gawagneh, Ahmad A. Al-Naimi, Wan Nur Syahida Wan Ismail.

Data curation: Laith Al-Shouha, Ohoud Khasawneh, Ahmad A. Al-Naimi, Mohammed Saram, Wan Nur Syahida Wan Ismail.

Formal analysis: Laith Al-Shouha, Shaher El-gawagneh, Ahmad A. Al-Naimi, Mohammed Saram, Wan Nur Syahida Wan Ismail.

Funding acquisition: Laith Al-Shouha, Ohoud Khasawneh, Wan Nur Syahida Wan Ismail.

Investigation: Laith Al-Shouha, Ahmad A. Al-Naimi, Mohammed Saram.

Methodology: Ohoud Khasawneh, Shaher El-gawagneh, Mohammed Saram.

Project administration: Laith Al-Shouha, Ohoud Khasawneh, Shaher El-gawagneh, Ahmad A. Al-Naimi, Mohammed Saram, Wan Nur Syahida Wan Ismail.

Resources: Laith Al-Shouha, Shaher El-gawagneh, Ahmad A. Al-Naimi, Mohammed Saram.

Software: Laith Al-Shouha, Ohoud Khasawneh, Ahmad A. Al-Naimi, Mohammed Saram.

Supervision: Laith Al-Shouha, Ahmad A. Al-Naimi.

Validation: Laith Al-Shouha, Ohoud Khasawneh, Shaher El-gawagneh, Ahmad A. Al-Naimi, Mohammed Saram.

Visualization: Laith Al-Shouha, Ohoud Khasawneh.

Writing – original draft: Laith Al-Shouha, Ohoud Khasawneh, Shaher El-gawagneh, Wan Nur Syahida Wan Ismail.

Writing – reviewing & editing: Laith Al-Shouha, Ohoud Khasawneh, Wan Nur Syahida Wan Ismail.

REFERENCES

1. Abdelaziz, H., Rim, B., & Helmi, H. (2022). The interactional relationships between credit risk, liquidity risk and bank profitability in MENA region. *Global Business Review*, 23(3), 561-583. <https://doi.org/10.1177/0972150919879304>
2. Ács, Z. L., Szerb, L., Lafeunte, E., & Márkus, G. (2020). *Global Entrepreneur Index 2019*. Global Entrepreneurship and Development Institute. Retrieved from http://thegeedi.org/wp-content/uploads/2021/02/2019_GEI-2019_fi

- nal_v2.pdf
3. Alhababsah, S. (2019). Ownership structure and audit quality: An empirical analysis considering ownership types in Jordan. *Journal of International Accounting, Auditing and Taxation*, 35, 71-84. <https://doi.org/10.1016/j.intacaudtax.2019.05.006>
 4. Angbazo, L. (1997). Commercial bank net interest margins, default risk, interest-rate risk, and off-balance sheet banking. *Journal of Banking & Finance*, 21(1), 55-87. [https://doi.org/10.1016/S0378-4266\(96\)00025-8](https://doi.org/10.1016/S0378-4266(96)00025-8)
 5. Asongu, S. A. (2018). Conditional determinants of mobile phones penetration and mobile banking in Sub-Saharan Africa. *Journal of the Knowledge Economy*, 9(1), 81-135. <https://doi.org/10.1007/s13132-015-0322-z>
 6. Bashayreh, A., & Wadi, R. M. A. (2021). The effect of fintech on banks' performance: Jordan case. In Alareeni, B., Hamdan, A., & Elgedawy, I. (Eds.), *The importance of new technologies and entrepreneurship in business development: In the context of economic diversity in developing countries* (pp. 812-821). ICBT 2020. Lecture Notes in Networks and Systems (Vol. 194). Springer International Publishing. https://doi.org/10.1007/978-3-030-69221-6_62
 7. Bouri, E., Lucey, B., & Roubaud, D. (2020). The volatility surprise of leading cryptocurrencies: Transitory and permanent linkages. *Finance Research Letters*, 33, Article 101188. <https://doi.org/10.1016/j.frl.2019.05.006>
 8. Campanella, F., Della Peruta, M. R., & Del Giudice, M. (2017). The effects of technological innovation on the banking sector. *Journal of the Knowledge Economy*, 8, 356-368. <https://doi.org/10.1007/s13132-015-0326-8>
 9. Cao, T., Cook, W. D., & Kristal, M. M. (2022). Has the technological investment been worth it? Assessing the aggregate efficiency of non-homogeneous bank holding companies in the digital age. *Technological Forecasting and Social Change*, 178, Article 121576. <https://doi.org/10.1016/j.techfore.2022.121576>
 10. Chen, M. A., Wu, Q., & Yang, B. (2019). How valuable is fintech innovation?. *The Review of Financial Studies*, 32(5), 2062-2106. <http://dx.doi.org/10.1093/rfs/hhy130>
 11. Chen, X., You, X., & Chang, V. (2021). Fintech and commercial banks' performance in China: A leap forward or survival of the fittest? *Technological Forecasting and Social Change*, 166(4), Article 120645. <http://dx.doi.org/10.1016/j.techfore.2021.120645>
 12. Cheng, M., & Qu, Y. (2020). Does bank fintech reduce credit risk? Evidence from China. *Pacific-Basin Finance Journal*, 63(3), Article 101398. <http://dx.doi.org/10.1016/j.pacfin.2020.101398>
 13. Chhaidar, A., Abdelhedi, M., & Abdelkafi, I. (2022). The effect of financial technology investment level on European banks' profitability. *Journal of the Knowledge Economy*, 14, 2959-2981. <https://doi.org/10.1007/s13132-022-00992-1>
 14. Cho, T.-Y., & Chen, Y.-S. (2021). The impact of financial technology on China's banking industry: An application of the metafrontier cost Malmquist productivity index. *The North American Journal of Economics and Finance*, 57(C). <https://doi.org/10.1016/j.najef.2021.101414>
 15. Dadoukis, A., Fiaschetti, M., & Fusi, G. (2021). IT adoption and bank performance during the Covid-19 pandemic. *Economics Letters*, 204(7), Article 109904. <http://dx.doi.org/10.1016/j.econlet.2021.109904>
 16. Daragmeh, A., Lentner, C., & Sági, J. (2021). Fintech payments in the era of COVID-19: Factors influencing behavioral intentions of "Generation X" in Hungary to use mobile payment. *Journal of Behavioral and Experimental Finance*, 32, Article 100574. <http://dx.doi.org/10.1016/j.jbef.2021.100574>
 17. Darolles, S. (2016). The rise of fintechs and their regulation. *Financial Stability Review, Banque De France*, 20, 85-92. (In France). Retrieved from <https://hal.science/hal-04010169>
 18. Dong, J., Yin, L., Liu, X., Hu, M., Li, X., & Liu, L. (2020). Impact of Internet finance on the performance of commercial banks in China. *International Review of Financial Analysis*, 72, 101579. <https://doi.org/10.1016/j.irfa.2020.101579>
 19. Faik, I., Barrett, M., & Oborn, E. (2020). How information technology matters in societal change: An affordance-based institutional logics perspective. *MIS Quarterly*, 44(3), 1359-1390. <http://dx.doi.org/10.25300/MISQ/2020/14193>
 20. Giatsidis, I., Kitsios, F., & Kamariotou, M. (2021). Digital transformation and strategy in the banking sector: Evaluating the acceptance rate of e-services. *Journal of Open Innovation Technology Market and Complexity*, 7(3), Article 204. <https://doi.org/10.3390/joitmc7030204>
 21. Gong, C., & Ribiere, V. (2021). Developing a unified definition of digital transformation. *Technovation*, 102(3), Article 102217. <http://dx.doi.org/10.1016/j.technovation.2020.102217>
 22. Hauswald, R., & Marquez, R. (2003). Information technology and financial services competition. *Review of Financial Studies*, 16(3), 921-948. <https://doi.org/10.1093/rfs/hhg017>
 23. Hua, X., Huang, Y., & Zheng, Y. (2019). Current practices, new insights, and emerging trends of financial technologies. *Industrial Management & Data Systems*, 119(7), 1401-1410. <http://dx.doi.org/10.1108/IMDS-08-2019-0431>
 24. Kenneth, L., & Jane, L. (2009). *Management information system managing the digital firm*. Pearson Education Inc.
 25. Kou, G., Olgu Akdeniz, Ö., Dinçer, H., & Yüksel, S. (2021). Fintech investments in European banks: A hybrid IT2 fuzzy multidimensional decision-making approach. *Financial Innovation*, 7, 39. <https://doi.org/10.1186/s40854-021-00256-y>
 26. Kriebel, J., & Debener, J. (2019).

- The effect of digital transformation on bank performance. SSRN, Article 3461594. <https://dx.doi.org/10.2139/ssrn.3461594>
27. Ky, S. S., Rugemintwari, C., & Sauviat, A. (2021). Friends or foes? Mobile money interaction with formal and informal finance. *Telecommunications Policy*, 45(1), Article 102057. <http://dx.doi.org/10.1016/j.telpol.2020.102057>
 28. Laudon, K. C., & Laudon, J. P. (2009). *Management information systems: Managing the digital firm*. Pearson Education Inc.
 29. Liberti, J. M., & Petersen, M. A. (2019). Information: Hard and soft. *Review of Corporate Finance Studies*, 8(1), 1-41. <https://doi.org/10.1093/rcfs/cfy009>
 30. Louati, H., & Hadoussa, S. (2021). Study of social media impacts on social capital and employee performance: Evidence from Tunisia Telecom. *Journal of Decision Systems*, 30(1), 118-149. <http://dx.doi.org/10.1080/12460125.2021.1872142>
 31. Luo, S., Sun, Y., Yang, F., & Zhou, G. (2022). Does fintech innovation promote enterprise transformation? Evidence from China. *Technology in Society*, 68(2-3), Article 101821. <http://dx.doi.org/10.1016/j.techsoc.2021.101821>
 32. Mbunge, E., Batani, J., Gaobotse, G., & Muchemwa, B. (2022). Virtual healthcare services and digital health technologies deployed during coronavirus disease 2019 (COVID-19) pandemic in South Africa: A systematic review. *Global Health Journal*, 6(2), 102-113. <http://dx.doi.org/10.1016/j.glohj.2022.03.001>
 33. Molyneux, P., & Thornton, J. (1992). Determinants of European bank profitability: A note. *Journal of Banking & Finance*, 16(6), 1173-1178. [http://dx.doi.org/10.1016/0378-4266\(92\)90065-8](http://dx.doi.org/10.1016/0378-4266(92)90065-8)
 34. Rega, F. G. (2017). The bank of the future, the future of banking: An empirical analysis of European banks. SSRN, Article 3071742. <http://dx.doi.org/10.2139/ssrn.3071742>
 35. Ruel, H., Rowlands, H., & Njoku, E. (2021). Digital business strategizing: The role of leadership and organizational learning. *Competitiveness Review*, 31(1), 145-161. <https://doi.org/10.1108/CR-11-2019-0109>
 36. Schindler, J. W. (2017). *Fintech and financial innovation: Drivers and depth* (Finance and Economics Discussion Series No. 2017-081). Board of Governors of the Federal Reserve System. <https://doi.org/10.17016/FEDS.2017.081>
 37. Sefried, M., & Riepe, J. (2023). The benefits of banks' IT investments in times of trouble: Evidence from loan loss accruals during the COVID-19 pandemic. *Journal of Business Economics*, 93(2), 149-171. <http://dx.doi.org/10.1007/s11573-022-01100-0>
 38. Song, T., Cai J., & Le, L. (2021). Towards smart cities by Internet of Things (IoT)-A silent revolution in China. *The Journal of the Knowledge Economy*, 12(2), 1-17. <https://doi.org/10.1007/s13132-017-0493-x>
 39. Thakor, A. V. (2020). Fintech and banking: What do we know? *Journal of Financial Intermediation*, 41, Article 100833. <http://dx.doi.org/10.1016/j.jfi.2019.100833>
 40. Theiri, S., & Alareeni, B. (2023). Perception of the digital transformation as a strategic advantage through the Covid 19 crisis? Case of Tunisian banks. *Journal of Sustainable Finance & Investment*, 13(2), 477-498. <http://dx.doi.org/10.1080/20430795.2021.1964809>
 41. Tunay, K. B., Yüksel, S., & Tunay, N. (2019). The effects of technology on bank performance in advanced and emerging economies: An empirical analysis. In Dinçer, H., & Yüksel, S. (Eds.), *Handbook of Research on Managerial Thinking in Global Business Economics* (pp. 263-280). IGI Global. <https://doi.org/10.4018/978-1-5225-7180-3.ch015>
 42. Villar, A. S., & Khan, N. (2021). Robotic process automation in banking industry: A case study on Deutsche bank. *Journal of Banking and Financial Technology*, 5, 71-86. <https://doi.org/10.1007/s42786-021-00030-9>
 43. Wang, R., Liu, J., & Luo, H. (2021a). Fintech development and bank risk taking in China. *European Journal of Finance*, 27(4-5), 397-418. <http://dx.doi.org/10.1080/1351847X.2020.1805782>
 44. Wang, Y., Xiuping, S., & Zhang, Q. (2021b). Can fintech improve the efficiency of commercial banks? – An analysis based on Big Data. *Research in International Business and Finance*, 55, Article 101338. <https://doi.org/10.1016/j.ribaf.2020.101338>
 45. Williamson, O. (1985). *The economic institutions of capitalism*. Free Press.
 46. Yoshikawa, T., & Phan, P. H. (2003). The performance implications of ownership-driven governance reform. *European Management Journal*, 21(6), 698-706. <https://doi.org/10.1016/j.emj.2003.09.013>
 47. Zarrouk, H., El Ghak, T., & Bakhouch, A. (2021). Exploring economic and technological determinants of fintech startups' success and growth in the United Arab Emirates. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), Article 50. <https://doi.org/10.3390/joit-mc7010050>
 48. Zhao, J., Li, X., Yu, C. H., Chen, S., & Lee, C. C. (2022). Riding the fintech innovation wave: Fintech, patents and bank performance. *Journal of International Money and Finance*, 122(8), Article 102552. <http://dx.doi.org/10.1016/j.jimonfin.2021.102552>