Article

Does Financial Technology Adoption Influence Bank's Financial Performance: The Case of Jordan

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Abstract: This research will examine the impact of the adoption of financial technology on conventional banks' financial performances. The research will place emphasis on the listed commercial banks at Amman Stock Exchange—ASE, using financial data for the period 2012–2020. The main study tool was a questionnaire that focuses on three main dimensions: financial inclusion—(FI), alternative payment methods—(APMs) and automation—(Auto). A total of 115 questionnaires were distributed to all commercial banks listed at Amman Stock Exchange—ASE. Multivariate regression analysis was employed to test the impact of the FinTech dimension as a proxy for independent variables on Jordanian commercial bank's financial performance as a proxy for dependent variables. Based on the analysis results, the study concludes that all three FinTech dimensions: FI, APMs and Auto. reflected a positive significant impact on Jordanian commercial bank's financial performance indicators (total deposit, total loans and net profit margin). Therefore, banks in general should invest more and more into financial technology tools and applications, in order to recruit potential clients and retain their current clients, to be able to sustain under fierce competition within the banking sector.

Keywords: financial technology; performance; sustainability; ASE; automation

1. Introduction

FinTech is a congregation of finance and technology. Schueffel (2016) stated that the term was developed primarily by Financial Services Technology Consortium, which was launched by Citigroup early 1990s. FinTech represents a novel financial model, combining technological innovation with financial services. It employs emerging scientific and technological means such as online settlement, mobile payments, and cloud computing to extend various financial services, including account settlement, investment management, and credit facilities (Hafez et al. 2023; Schueffel 2016).

According to the KPMG Klynveld Peat Marwick Goerdeler report (2019), there was a growth rate of 120% in global investment in FinTech in 2018 compared to the previous year, reaching a total of USD 111.8 billion. Currently, there are over 310 FinTech start-ups in the MENA region, with approximately 7% of them based in Jordan. The Central Bank of Jordan—CBJ contributed significantly toward the development of financial technology, realizing banks' essential importance in shaping the future prospect of the banking sector (AB Accelerator 2020).

Despite mobile phone usage exceeding 100 percent, the banking sector in Jordan has less than 35 percent of the total customer population. The CBJ has made significant efforts towards achieving financial inclusion by adopting retail payment systems, electronic payments and innovative solutions that benefit potential segments of the community, in rural areas and also for women. Additionally, CBJ is developing legal frameworks that

protect electronic transactions, creating opportunities for the banking industry to integrate pioneering FinTech solutions, reduce costs, enhance flexibility, attract deposits and promote financial inclusion (De Roure et al. 2021; Dwivedi et al. 2021; Feyen et al. 2021; Hamadeh 2022; Nguyen 2022; Dang and Nguyen 2021).

Due to the huge shift in banking services performance, FinTech has become an indispensable element in their daily activities, and banks are struggling to lead in this domain under a fierce competition environment. Thus, the main objective of this article is to investigate the impact of FinTech dimensions on the financial performance indicators of all Jordanian-listed commercial banks at ASE. The research will analyze whether or not (FI), (Auto.) and (APMs) influence financial performance indicators using total loans (TL), total deposits (TD) and net profit margin (NPM). A well-structured questionnaire was utilized to accomplish the study objectives. Referring to the problem statement above, the following main question was formulated:

Q1: Does financial technology adoption impact the bank's financial performance indicators?

Though financial indicators such as EPS, ROA, CFS and ROE are imperative for analyzing banks' financial efficiency, TD, TL and NPM are also essential indicators that can be used for the same reason. This is due to the importance of such ratios in assessing banks' management efficiency in attracting more deposits from current and potential clients. Therefore, the higher the deposit volume, the more efficient the banks management. This is also applicable to the total loan volume, as it measures the level of management efficiency in employing their loanable funs, to generate more profit and ultimately enhance the bank's financial position as well as increases owners' wealth as it is the ultimate goal for financial management. Regarding the NPM ratio, it assesses the bank's ability in generating more profit for investors, the higher the NPM means that the bank can sustain any future undesirable shocks that may come across during its course of business.

The structure of the research will be as follows: The next section will focus on the theoretical framework and literature review of related studies that will be discussed and scrutinized. Thereafter, the research methodology section will be mainly attributed to research design, data collection and analysis methods, followed by hypotheses testing. Finally, the findings and discussion will be presented, followed by the main recommendations.

2. Financial Technology (FinTech)

2.1. FinTech Concept

Financial technology is a group of innovative services braced by progressions of information and communication technologies and systems (Barbu et al. 2021). While Abad-Segura et al. (2020) defined FinTech as containing pioneering entities that extend financial services, based primarily on technology. Financial technology encompasses computer software and technologies that enable banking services, toward the invention of numerous banking transactions, such as online payment, credit cards, wiring money, e-money, ATM, etc. (Nurlaela et al. 2020). It also denotes the adoption of the Internet and computerized expansions within the financial sector services (Zaghol et al. 2021). Thus, FinTech reflects the adoption of technology by the financial sector services (Gai et al. 2018).

Advanced technology, such as AI, mobile wallets, IoT, NFC, and block chain, is essential to FinTech (Lim et al. 2019). The use of these know-hows in FinTech services has been considered (Suseendran et al. 2019). Barbu et al. (2021) noted that the FinTech impact rests on technology innovation and the incorporation of innovative procedures, resulting in 24/7 financial services with customized creation and delivery, enhancing consumers' experience. FinTech is related to service innovation and innovation among financial business models (Nangin et al. 2020).

FinTech companies are oriented further towards technology rather than the traditional ones, providing financial services faster, more conveniently, and at lower costs through the help of information technology. Romanova and Kudinska (2016) concluded that both pioneering IT companies and traditional banking sector are tracking financial technology, using technology to improve their services. FinTech offers an online platform to connect

borrowers and lenders, evading the use of traditional bank systems and procedures. The banking sector probable will grow rapidly and continuously in an innovative and dynamic way, utilizing Pcs and other digital know-hows related to financial services. Zaghol et al. (2021) and Puschmann (2017) stated that FinTech can manifest broadly through digitalization within the financial services sector by considering possible financial solutions via information technology (IT).

2.2. FinTech and Banks

The use of technology in the banking sector is to produce banking services and products that meet customer needs and desires (Mbama 2018). Friedline et al. (2018) proclaim that FinTech enabled all society segments to obtain better financial inclusion and FinTech improvement inside a country can be accredited to its affirmative impact on banking institutions and the public. FinTech displays a major function in decreasing the number of credit facilities that bear high interest rates. Petralia et al. (2019) also added that the FinTech introduction and its progress have substantial effects on conventional banking business models. Likewise, FinTech now is prevailing in diverse financial fields, such as lending, deposit, investment, account settlement and raising capital (Nguyen et al. 2021).

Arslanian and Fischer (2019) added that there is a rivalry between conventional banking services and FinTech, which adversely impacts conventional banking services in relation to their risk-taking, performance and innovation. Buchak et al. (2018) were pioneering in analyzing the integration of regulatory facets when inspecting the impact of FinTech to render credit service on bank's financial performance.

3. Literature Review

Different examples of research have supported the possibility of FinTech improving financial services by enhancing the quality of provided services, performing more affordable transactions, as well as providing comfier, more secure and improved business structures (Nguyen et al. 2021; Chen et al. 2019; Yao and Song 2021). Rita (2018) concluded a positive reaction of stock market prices due to FinTech adoption by certain banks.

Both hypotheses are related to customer and disruptive innovation, and the evolution of FinTech may have an influence on the banking industry. The consumer hypothesis advocates that FinTech will substitute emerging financial entities by serving incumbents that react similarly to customer's demands. The hypothesis of disruptive innovation argues that market participants follow and adopt pioneering know-hows to furnish more accessible and reasonable services that are extremely competitive in the marketplace (Nguyen et al. 2021). On the other hand, Yudaruddin (2022) stated that customer or client theory elucidates that FinTech startups extend innovative services that meet customer demand, substituting banking sector old services. Alternatively, the disruptive innovation theory proposes that FinTech startups can profit from pioneering technology to offer clients smooth access to services, resulting in substantial competition between traditional banks.

Juengerkes (2016) mentioned that banks trust their clients and gain complementary impact by collaborating with FinTech startups to face disruptive innovation. Nguyen et al. (2021) indicated that in relation to the settlement of payment, FinTech permits mobile payment with minor costs, leading to a decrement in long-term advantages of commercial banks.

Abdul-Majid et al. (2017) noted that traditional banks as well as Islamic banks, are not experiencing similar technology. Additionally, Islamic banks are restricted by high costs related to Sharia counsellors, particularly auditors and products (Yudaruddin 2022). Panjwani and Shili (2020) added that, the level of innovation within Islamic banks is considered stumpy due to the recent development of Islamic finance, while Islamic banks were slower in terms of the response to the impact of FinTech in comparison to traditional banks (Ali et al. 2019). Nguyen and Dang (2022), in their study on FinTech and commercial bank's financial stability in emerging markets, FinTech development negatively affected financial stability. However, based on heterogeneity analysis the negative effect of FinTech development on financial stability is stronger when the degree of financial stability is low,

and that such a negative effect becomes weaker when there is higher foreign ownership. One article (Shuli et al. 2022) suggested that FinTech has a positive impact on banks' ROE and banks' TA and on NIM also on credit risk measured by NPL.

4. FinTech Dimensions

4.1. Financial Inclusion

Financial inclusion refers to the situation where business entities and individuals have access to a variety of financial services and products, such as money transfers, insurance, payments, savings and credit, that are cost-effective and suitable for their needs, ultimately leading to an improvement in their standard of living. Its primary objective is to serve the entire society, including organizations and people, by providing them with access to financial services, especially those who are poor or have limited income, in order to improve their financial status and condition (Alnabulsi and Salameh 2022).

Furthermore, Erfan et al. (2021) note that financial inclusion is beneficial for citizens as it enables them to fully understand and recognize basic financial terms and offers them protection as financial customers. Alnabulsi and Salameh (2022) add that financial inclusion helps increase citizens' opportunities to use the services of small and micro-businesses, as well as digital payments. Additionally, Kartawinata et al. (2021) state that financial inclusion is valuable in preserving the interests and rights of relevant parties while also increasing their level of awareness. Ultimately, Alnabulsi and Salameh (2022) conclude that financial inclusion is essential for adopting an inclusive strategy regarding sustainable development, leading to a positive significant influence on meeting the growth and stability objectives across different sectors, including social and economic sectors.

4.2. Alternative Payment Methods (APMs)

In recent years, the payment industry has gained new insights that have led to the improvement of payment methods for individuals in various circumstances, regions and environments. These insights have included advancements in credit and debit cards, wallets and mobile wallets, online banking e-payments, direct debit, invoice and pay later solutions, cash payments and cryptocurrencies, as outlined in the Payment Methods Report of 2019.

4.3. Automation

According to Sobczak (2022), institutions are increasingly turning to IT solutions, including software robots, to automate procedures and drive digital transformation. Additionally, Swan (2017) noted that an automated economy, which focuses on the operations of the economy, is applicable in situations where robotic technology complements or replaces human labor.

Anagnoste (2017) observed that robotic automation has led to a change in the employment structure, requiring the redeployment of employees to more advanced tasks that create greater added value, but also necessitating the retraining of some employees. It is worth mentioning that the banking sector is particularly affected by robotic process automation, as noted by Kedziora and Penttinen (2020).

5. Hypotheses Development

Based on the above arguments and discussion, this research will focus on the role exercised the FinTech three dimensions (financial inclusion, alternative payment method and automation) on total deposit, total loans and net profit margin as proxies for financial performance of listed Jordanian commercial banks at ASE, by testing the following hypotheses:

H$_1$. *There is a statistical impact of FinTech on banks' financial performance, weighted by total deposit.*

H$_{1.1}$. *There is a statistical impact of financial inclusion on banks' total deposits.*

H$_{1.2}$. *There is a statistical impact of the alternative payment method on banks' total deposits.*

H$_{1.3}$. *There is a statistical impact of automation on banks' total deposits.*

H$_2$. *There is a statistical impact of FinTech on banks' financial performance, weighted by total loans.*

H$_{2.1}$. *There is a statistical impact of financial inclusion on banks' total loans.*

H$_{2.2}$. *There is a statistical impact of the alternative payment method on banks' total loans.*

H$_{2.3}$. *There is a statistical impact of automation on banks' total loans.*

H$_3$. *There is a statistical impact of FinTech on banks' financial performance, weighted by Net Profit margin.*

H$_{3.1}$. *There is a statistical impact of financial inclusion on banks' net profit margin.*

H$_{3.2}$. *There is a statistical impact of the alternative payment method on banks' net profit margin.*

H$_{3.3}$. *There is a statistical impact of automation on banks' net profit margin.*

6. Jordanian Banking Sector

Pakurár et al. (2019) stated that the banking sector in Jordan is composed of three types of banks: commercial banks, Islamic banks and foreign banks. There are four Islamic banks, nine foreign banks and sixteen commercial banks. Madanat and Khasawneh (2018) noted that the Central Bank of Jordan categorizes banks into two types: national banks and branches of foreign banks, which are further classified as Islamic or commercial banks.

As per the Banking in Jordan report (2022), there are currently 25 commercial banks in Jordan, including 3 Islamic banks and 9 foreign banks. Madanat and Khasawneh (2018) added that the banking sector plays a critical role in Jordan's economy, serving as one of its foundations. Furthermore, in 1999, Jordan had 22 national commercial banks and 5 international commercial banks, according to the same study. It should be noted that Jordan's economy is dominated by the service sector, which includes communication, health, financial services and education. Additionally, nearly 17% of Jordan's GDP is attributable to the financial system.

Al-jazzazi and Sultan (2017) stated that the banking sector in Jordan is expanding due to the growth of commercial and Islamic domestic banks, in addition to the entrance of new foreign banks. This development has resulted in increased competition among banks. Furthermore, Ala'raj et al. (2018) noted that the banking sector in Jordan provides various facilities for financial credit to both consumers and different industrial sectors, subject to various risks.

7. Methodology

7.1. Population and Sample

The research population and sample consist of 13 listed Jordanian commercial banks at ASE, and their financial information and data are available for the study period 2012–2020. The study observations encompass managers key staff members working in a bank's various departments. An appropriate intentional sample technique was used; 115 questionnaires were distributed and 52 questionnaires were retrieved. However, 11 questionnaires were omitted due to unfinished responses. Thus, 41 valid questionnaires were used for analysis by the study sample observations which were retrieved from Jordanian commercial banks.

7.2. Variables Measurement

The research incorporated a group of variables that should be measured accurately to examine the hypotheses and generate reliable results. FinTech is the key independent variable, measured using three variables (dimensions): (FI), (APMs) and (Auto.). Banks' financial performances represent the dependent variables, measured by total deposits (TD), total loans (TL) and net profit margin (NPM). The method employed to measure each of the study's variables is outlined below.

7.2.1. Dependent Variables

To measure financial performance, three indicators: TD, TL and NPM were calculated. Data pertaining to study variables were collected from published financial statements, for 2012–2020. To attest to the consistency between study dependent and independent variables, arithmetic averages of nine years for each bank were calculated.

7.2.2. Independent Variables

It is worth noting when measuring the FinTech dimensions, they were represented by FI APMs and Auto. The questionnaire consisted of several paragraphs that pertained to each of the three dimensions, and it was answered by the study observations in the sample banks. To ensure consistency with the data of the dependent variables, each bank's questionnaires were separated, and then the overall average of valid observations' responses pertaining to each bank was considered. This resulted in deriving one questionnaire for each bank. The fifth Likert scale was utilized to measure the responses of the observations regarding each FinTech dimension.

7.3. Research Design

To achieve the study objectives and to answer its related queries. The study will adopt a quantitative deductive approach using a questionnaire as a main tool in addition to secondary financial information. The questionnaire has been structured on the basis of the bank's key employees' and managers' points of view and a literature review. The questionnaire was distributed into two major sections; section one relates to participants' demographic information, including gender, position, age, years of experience and education. Section two is attributed to the overall impact of financial inclusion (FI), automation (Auto), and alternative payment methods (APMs) on commercial bank's performance.

The 5-point Likert scale was employed for the questionnaire, where 1 specifies the least important and 5 specifies the most important. Respondents should have the required knowledge regarding FinTech and its significance in the banking sector. Hence, the selected sample will involve managers and key staff members working in Jordanian banks.

7.4. Study Reliability Test

To collect the necessary data, a well-structured questionnaire was designed as a study tool. To ensure the face validity of the questionnaire, a group of academics was consulted to review the questions and verify the reliability of their content and structure. The opinions of these editors from faculty members at universities were taken into consideration, and some paragraphs were reformulated and amended as needed to achieve a balanced and effective questionnaire. The questionnaire was divided into two major sections:

One of the most important aspects to consider in questionnaire preparation is to ensure the availability of stability and reliability elements. The stability coefficient indicates that the measurement tool is stable and consistent, which means that it should provide similar results if it is re-applied to the same sample (see Table 1). To achieve the study objectives, the stability test tool using Cronbach's Alpha was applied on the questionnaire paragraphs using the internal consistency equation method. This method emphasizes defining measurement tool reliability, to provide the same or similar results if the analysis were repeated in comparable conditions on identical or a similar sample. Furthermore, the Convergent Validity test was conducted using factor loadings, Cronbach's alpha value and the tolerance coefficient.

Table 2 indicates that all questions in the questionnaire have high stability ratios based on Cronbach's Alpha coefficient. The coefficient was statistically suitable for all the questionnaire's components, as Cronbach's Alpha values for all variables were more than 70%. The lowest stability value was 0.936.

Table 1. Study Tool Components.

Part one: Demographic questions	
Gender, Academic Qualification, Age, Experience, Job title, Department	
Part two: Research questions	
Financial Inclusion	10 questions
Alternative Payment Methods	10 questions
Automation	10 questions

Table 2. Study Tool Test.

Factor	Cronbach's Alpha
Financial Inclusion	0.952
Alternative Payment Methods	0.936
Automation	0.966

8. The Descriptive Statistics of the Study Sample and Its Variables

8.1. The Demographic Distribution of the Observations Responding to the Study Tool

Table 3 shows the study sample demographic distribution.

Table 3 presents the study sample demographic distribution, and it is apparent that the number of males exceeded females in the sample, with a percentage of (65.9%). Regarding academic qualification distribution, it was observed that the majority of the sample hold a bachelor's degree, with a percentage of (68.3%). Additionally, a considerable proportion of the sample holds a master's degree, with a percentage of (14.6%). In terms of PhD holders, their percentage was (7.3%) of the study sample. Moreover, it was found that most of the sample observations were aged between 35 and 40 years old, with a percentage of (34.1%). Furthermore, it is noteworthy that the sample had more than 5 years of experience, with a percentage of (80.5%).

Table 3. Study sample demographic distribution.

Category	Variable	Repetition	%
Gender	Female	14	34.1
	Male	27	65.9
	Total	**41**	**100**
Academic Degree	Ph.D.	3	7.3
	Master	6	14.6
	High diploma	2	4.9
	Bachelor	28	68.3
	Diploma	2	4.9
	High Secondary school	0	0
	Total	**41**	**100**
Age	Less than 35	7	17.1
	35—less than 40	14	34.1
	40—less than 45	10	24.4
	45—less than 50	7	17.1
	More than 50	3	7.3
	Total	**41**	**100**

Table 3. *Cont.*

Category	Variable	Repetition	%
Years of Experience	Less than 5 years	8	19.5
	5—Less than 10 years	10	24.4
	10—less than 15 years	20	48.8
	More than 15 years	3	7.3
	Total	**41**	**100**
Job title	Financial Analyst	4	9.8
	Manager	9	22
	Accountant	20	48.8
	Internal Auditor	3	7.3
	Credit officer	5	12.2
	Total	**41**	**100**
Departments	Credit dept.	14	34.1
	Securities dept.	13	31.7
	Deposit dept.	14	34.1
	Total	**41**	**100**

8.2. Independent Variables Descriptive Analysis

To determine the questionnaire's answer levels, the researcher used descriptive analysis was employed to calculate standard deviations and arithmetic means of all answers pertaining to each section, and the general result for each question. The sample was requested to respond to the questions conferring to the Pentagonal 5-point Likert scale. Accordingly, the arithmetic mean was considered by dividing it into five sections as follows: $(5 - 1)/5 = 0.8$. The distribution becomes as follows:

Table 4 demonstrates descriptive analysis outcomes to questions pertaining to financial inclusion (independent variable). The lowest-ranked question was question (10), which infers the role of banks in developing different economic sectors in the country. On the other hand, the highest-ranked questions in terms of the mean value is (3.86) are questions (1) and (2) which suggest the role was practiced by banks in providing useful financial services to society as well as its role in economic development. The level of application for all paragraphs related to (FI) variable was high, with an arithmetic average mean reaching (3.65) and a Std. Dev. of (0.566). Thus, we can conclude that financial inclusion possesses a significant and important impact.

Table 5 below presents descriptive analysis results related to the second independent variable (alternative payment methods). Questions no. (2) and no. (3) reflected the lowest arithmetical mean with a value of (3.78), while the highest-ranked question, with an average mean of (4.07), which imply that the adoption of alternative payment methods, will improve the effectiveness of banks' financial performance. The overall results specify that the APM application degree is high in Jordanian commercial banks, with a value of (3.89) and a standard deviation of (0.494). Generally speaking, APMs application by sample banks reflected high importance.

Table 6 below extends descriptive analysis outcomes pertaining to the independent variable (automation) based on the answers to the questions. The lowest ranking questions, with an average mean of (3.95) relate to questions (3) and (4) which enquire about the impact of automation on employment structure and its relationship with the surrounding economy. Conversely, the question with the highest mean, of (4.70), discusses the potential competency differences between the bank staff members. Based on the overall results we can conclude that implementing automation in Jordanian commercial banks will be of great importance in connection to performance.

Table 4. Descriptive analysis results related to financial inclusion dimension.

No.	Question	Mean	Std. Dev.	Significance
1	Does the bank provide financial services that are useful to different segments of society?	3.86	0.691	High
2	Does the bank play a major role in obtaining economic development?	3.86	0.654	High
3	Can institutions and people access remotely different financial services at a low cost?	3.71	0.716	High
4	Is the bank's main goal to help individuals with limited income to enhance their financial status?	3.71	0.642	High
5	Do you think that clients have good opportunities to benefit from payment services, including digital payments?	3.59	0.805	High
6	Does the bank offer all types of banking services through the Internet, or some kind of bank's application?	3.61	0.703	High
7	Do you agree that the bank preserves clients' interests and rights?	3.56	0.709	High
8	Does the bank enhance the awareness of its clients in relation to their ability to make financial decisions?	3.61	0.628	High
9	Do you agree that the bank adopts an inclusive strategy for the purpose of attaining sustainable development?	3.54	0.636	High
10	Does the bank participate in the development of different sectors within the economy?	3.49	0.553	High
	Financial Inclusion Average	**3.65**	**0.566**	**High**

Table 5. Alternative payment methods descriptive analysis.

No.	Question	Mean	Std. Dev.	Significance
1	Did the bank shift to APM use for the purpose of improving service quality?	3.76	0.624	High
2	Does the adoption of APMs provide the bank with the attention of other new clients such as individuals and institutions?	3.78	0.652	High
3	Will the adoption of APMs lead to novel payment systems in the bank?	3.78	0.613	High
4	Are the APMs sustained by the services provided by the bank?	3.93	0.608	High
5	Does the use of APMs have an impact on the bank's performance effectiveness?	4.07	0.608	High
6	Does the use of APMs increase the number of clients?	4.05	0.590	High
7	Has the use of APMs reduced the cost of services offered by the bank?	3.93	0.648	High
8	Has the use of APMs positively impacted the bank's financial performance?	3.83	0.667	High
9	Do bank clients use the method they prefer in order to meet their needs?	3.88	0.600	High
10	Does the bank offer widely accepted payment approaches including traditional and online payment methods?	3.90	0.583	High
	Alternative Payment Methods Average	**3.89**	**0.494**	**High**

Table 6. Automation dimension descriptive analysis.

No.	Question	Mean	Std. Dev.	Significance
1	Do you think that the bank uses IT solutions for the purpose of automating different processes and operations that are performed?	4.07	0.685	High
2	Does the bank implement automation workflow systems?	4.02	0.758	High
3	Are automation implementations affected by the employment structure in the bank?	3.95	0.773	High
4	Does implementing automation mean that the bank is involved in the surrounding economy?	3.95	0.740	High
5	Does the bank use and apply artificial intelligence technology systems in its operation?	4.02	0.758	High
6	Are the automation systems upgraded as per clients' needs?	4.00	0.742	High
7	Are the automation systems adaptable due to changes in the bank's workflow?	4.07	0.787	High
8	Has automation led to a reduction in the cost related to human resources?	4.10	0.700	High
9	Is there a gap in the potential competencies of employees in the bank?	4.12	0.704	High
10	Does there exist an organizational change in the bank due to automation?	4.13	0.714	High
	AutomationAverage	**4.04**	**0.645**	**High**

Table 7 below demonstrates an average results summary of financial technology different dimensions (financial inclusion, alternative payment methods, and automation). Based on the descriptive analysis conducted in Jordan, it can be observed that there is a high level of application for all FinTech dimensions in commercial banks. However, automation appears to be the most important dimension, as evidenced by its (4.04) arithmetic mean, followed by alternative payment methods with an (3.890) arithmetic mean, and a high level of importance. financial inclusion with a (3.65) arithmetic mean also exhibits a high degree of importance.

Table 7. FinTech dimensions descriptive analysis.

No.	Financial Technology Dimensions	Mean	Std. Dev.	Significance
1	FI	3.65	0.566	High
2	APMs	3.89	0.494	High
3	Auto.	4.04	0.645	High

8.3. Hypotheses Test

For the purpose of testing study hypotheses, the questionnaires for each bank were segregated. All the mean answers for each bank individually were totaled to generate a single questionnaire. Regarding financial data that were collected in commercial banks' statements, the average for each bank was computed across all years of the study to derive a single mean related to all dependent variables.

To determine outcomes related to the main hypotheses, multiple regression analysis was applied. The Sig. F significance level was approved to reject or accept the study model and evaluate its appropriateness to portray study variables relationship. The decision that rules implies the model will be accepted if the Sig. F significance is below 5%. In order to evaluate each independent variable's impact on the dependent variable separately, the Sig T value will be adopted; this means that if Sig. T significance is less than 5%m the null hypothesis will be accepted, or otherwise it will be rejected. Concerning the adjusted

R^2 value it will indicate the justification that occurs to the dependent variable due to the change in the independent variable

First main hypothesis (H$_1$). *There is a statistical impact of FinTech on banks' financial performance, weighted by total deposit.*

The results in Table 8 are related to multiple regression analysis to test FinTech dimensions; (FI), APMs and Auto and the impact on Jordanian commercial banks. The outcomes indicate that the calculated F value for the Jordanian environment was 27.166, with a significance level below 5%, proposes that the model is appropriate. Additionally, a Sig. F-statistic value of 0.000 implies that FinTech significantly impacts financial performance indicator, measured by total deposit. The value of the adjusted R^2 value was 0.867, specifying that nearly 86.7% of the changes in total deposit can be explained by changes in the FinTech dimension application. This value is considered resilient for interpretation and prediction purposes, and it is reliable as it exceeds the minimum threshold of 40% recommended by Lehmann et al. (2011).

Table 8. First hypothesis multiple regression test results.

Variables	β Coefficient	Std. Error	t-Statistic	Probability
Constant	-------	0.584	7.014	0.000
Financial Inclusion	0.650	0.079	5.994	0.000
APMs	0.694	0.088	6.582	0.000
Automation	0.460	0.069	4.251	0.002
R	0.949			
R^2	0.901			
Adjusted R^2	0.867			
S.E. of regression	0.142			
F-statistic	27.166			
Probability (F-stat.)	0.000			

In order to diagnose the impact of FinTech's three dimensions separately on listed Jordanian commercial banks' total deposit, multiple regression test results were employed as follows:

H$_{1.1}$. *There is a statistical impact of financial inclusion on banks' total deposits.*

Considering the Jordanian environment, Table 8 indicates that, significance level value (Sig. T) of 0.000 (below 5% significance level), which imply that there is a statistically positive impact of financial inclusion on the volume of total deposit as a proxy for financial performance, with (β Coefficient = 0.650) indicating this positive impact.

H$_{1.2}$. *There is a statistical impact of the alternative payment method on banks' total deposits.*

Referring to the same Table 8 above, it is also obvious that the alternative payment methods significance level is also below 5%. Therefore, we can suggest that APMs possess a statistical impact on Jordanian listed commercial bank's total deposit as one of the financial performance proxies as the (β Coefficient of 0.694) demonstrates such impact.

H$_{1.3}$. *There is a statistical impact of automation on banks' total deposits.*

Regarding the FinTech automation dimension, Table 8 results clearly demonstrate that the dimension reflected a statistical significance (Sig. T) below 5%, implying that automation has a reliable impact on the total deposit volume as a financial performance indicator. Concerning the coefficient value (0.069), it specifies that, by applying automation by banks, the total deposit volume will rise in Jordan.

Second main hypothesis (H$_2$). *There is a statistical impact of FinTech on banks' financial performance, weighted by total loans.*

Table 9 exhibits multiple regression analysis results related second main hypothesis and its sub-hypotheses Jordanian commercial bank's total loans as a proxy dependent variable. It is noticeable that the calculated F value was (22.880), which is significant at 5% level, specifying that the study model is proper. Based on regression analysis outcomes, it is clear that (Sig. F-stat.) of (0.000), the second main hypothesis is accepted, indicating the existence of a statistical impact of FinTech on the amount of total loans as financial performance indicator related to listed Jordanian commercial banks at ASE.

Table 9. Second hypothesis multiple regression test results.

Variables	β Coefficient	Std. Error	t-Statistic	Probability
Constant	-------	0.611	6.654	0.000
Financial Inclusion	0.646	0.083	5.511	0.000
APMs	0.656	0.092	5.761	0.000
Automation	0.516	0.072	4.416	0.002
R	0.940			
R^2	0.884			
Adjusted R^2	0.845			
S.E. of regression	0.149			
F-statistic	22.880			
Probability (F-stat.)	0.000			

The results also imply that the model-adjusted R^2 value is (0.845), which suggests that 84.5% of the variations in total loans amount within the Jordanian banking sector and may be attributed to changes in FinTech application. Suggesting that this model-adjusted R^2 value is considered too strong for predicting and interpreting the purpose and is deemed reliable. To define the impact of each FinTech dimension on Jordanian in commercial bank's total loans, multiple regression test results were as follows:

H$_{2.1}$. *There is a statistical impact of financial inclusion on banks' total loans.*

Table 9 results state that financial inclusion reflects a positive significant impact on the volume of Jordanian commercial banks Total Loans, as Sig. t value was 0.000, which is less than the study significance level of 5%. Leading to the acceptance of the above sub-hypothesis. Additionally, the Coefficient value amounted to 0.646, indicating a confident impact of financial inclusion implementation on the total loan volume.

H$_{2.2}$. *There is a statistical impact of the alternative payment method on banks' total loans.*

Table 9 reveals that, on the basis of regression analysis results, a statistical impact of FinTech APMs dimension on financial performance is measured by total loans volume in the Jordanian banking sector. Regarding adjusted R^2 of (0.845), it infers that 84.5% of the total loan volume variation is referred to the change in APMs application on listed Jordanian commercial banks. Based on the Sig. t value of 0.000, we accept the second sub-hypothesis, and conclude that APMs FinTech dimension impact Total Loan's volume significantly. Regarding the β Coefficient value of (0.656), it indicates a positive impact of the employment of APMs on the total loan amount.

H$_{2.3}$. *There is a statistical impact of automation on banks' total loans.*

Regarding the third sub-hypothesis which is related to the third FinTech dimension (automation), the Sig. t outcome which equals 0.002, it inclines the acceptance of the hypothesis. This concludes that the automation dimension impacts total loans significantly.

Furthermore, the β Coefficient value of 0.516 shows a positive impact of automation on total loans.

Third main hypothesis (H₃). *There is a statistical impact of FinTech on banks' financial performance, weighted by Net Profit margin.*

The above table demonstrates Multivariate regression analysis outcomes related to the third main hypothesis and its sub-hypotheses concerning the FinTech main three dimensions: (FI), (APMs) and (Auto.) impact on net profit margin as a proxy for the dependent variable in listed Jordanian commercial banks.

By considering the Jordanian environment, above Table 10 indicates that the calculated F-value of 23.808 is significant at a 5% level, which suggests that we have a valid study model. Additionally, based on regression analysis outcomes, the Sig. F-stat. value (0.000) is less than 5% (study significance level), indicating that the third main hypothesis is accepted. This finding suggests that there is a statistical effect of FinTech on net profit margin as a proxy of financial performance. Furthermore, adjusted R^2 of 0.951, implies that almost 95.1% of fluctuations that occur to the net profit margin of listed Jordanian commercial banks can be justified by the changes that occur to FinTech's application. The adjusted value related to this model is considered strong in the prediction and explanation process. To identify each FinTech dimension impact on the net profit margin related to listed Jordanian commercial banks in the multiple regression results were as follows:

Table 10. Third hypothesis multiple regression test results.

Variables	β Coefficient	Std. Error	t-Statistic	Probability
Constant	-------	0.659	3.519	0.007
Financial Inclusion	0.595	0.089	5.174	0.001
APMs	0.660	0.100	5.900	0.000
Automation	0.574	0.077	4.997	0.001
R	0.942			
R^2	0.888			
Adjusted R^2	0.951			
S.E. of regression	0.161			
F-statistic	23.808			
Probability (F-stat.)	0.000			

H₃.₁. *There is a statistical impact of financial inclusion on banks' net profit margin.*

Table 10 highlights that, in the context of the Jordanian banking sector, Sig. t significance level was 0.001 which is below 5% level. Thus, we can establish that financial inclusion consumes a positive impact on net profit margin, leading to the acceptance of the first sub-hypothesis. This denotes that there is a statistical influence of financial inclusion on net profit margin as a proxy of financial performance. β Coefficient value of 0.5995 advocates that financial inclusion adoption impacted the net profit margin positively.

H₃.₂. *There is a statistical impact of the alternative payment method on banks' net profit margin.*

Based on Table 10 and taking into account the Jordanian banking sector, it can be observed that (Sig. T) value of (0.000) is less than 5%. Therefore, we can proclaim that APMs impacts significantly net profit margin. Thus, a second sub-hypothesis is accepted, which states that: APMs reflected a statistical impact on net profit margin as the financial performance proxy. The value of β Coefficient of 0.660 advises that alternative payment methods implementation has a positive impact on net profit margin.

H₃.₃. *There is a statistical impact of automation on banks' net profit margin.*

After considering Table 10 and the Jordanian environment, it can be observed that Sig, t value of 0.001 indicates a statistical significance level, leading to the acceptance of the third sub-hypothesis. This means that automation impact significantly net profit margin indicator. On the basis of the β Coefficient value (0.574), it shows the existence of a positive impact of automation on the net profit margin.

9. Findings and Discussion

Based on the discoveries presented in the previous chapter, where the researcher analyzed 41 questionnaires to investigate the relationship between variables, it is important to note that the study objective is to evaluate financial technology adoption by banks in order to enhance their financial performance indicators and also to examine whether the adoption of financial technology impacts banks' financial performance. Therefore, the following is a brief discussion of each of the attained outcomes based on FinTech dimensions.

Firstly, referring to the impact of FinTech dimensions on commercial bank's financial performance measured by the total deposit. It was concluded that FinTech dimensions reflected a positive significant impact on the total deposit volume. Where the impact of each dimension differs from each other as APMs demonstrated the highest impact (β Coefficient = 0.694) followed by the FI dimension (β Coefficient = 0.650). Thus, employing FinTech within the Jordanian banking sector will increase the total deposit volume, as it will permit clients to have access to banking services 24/7 (Li et al. 2020).

Secondly, related to the impact of FinTech on commercial bank's total loans as the second proxy of financial performance. The results reveal a positive significant impact of all FinTech dimensions on total loan volume. This, suggest that the adoption of FinTech for loan service, will encourage clients to apply for different types of loans at any time, as it facilitates the process of obtaining loans, leading to an increase in total loans amount. The results also indicate that FinTech application explains 84.5% of the changes in total loan volume (Hu et al. 2019).

Finally, based on the study results pertaining to the impact of FinTech exist on the bank'ss net profit margin—NPM. It was clear that FinTech plays a significant role in elevating NPM, as all FinTech dimensions reflected a significant positive impact on NPM. This may be attributed to the reason that FinTech will reduce operational costs (Liu and Jiang 2020) and increase sale volume leading to an incremental effect on the bank's profitability level.

10. Recommendations

The researcher suggests that banks should adopt an inclusive strategy to achieve sustainable development and use alternative payment methods to attract new clients while encouraging clients to use preferred FinTech methods to meet their needs. Furthermore, banks should participate in the surrounding economy by fully automating their systems to bridge potential competence gaps among employees, and continually upgrade their automation to meet client needs. The researcher encourages other researchers to conduct future studies for development and comparison, as well as raise awareness about FinTech's impact on banks' financial performance.

11. Conclusions

This study's main goal was to investigate and analyze FinTech adoption by listed Jordanian commercial banks at ASE, in order to elevate their financial performance and to determine whether this adoption impacts the financial performance of banks. Data were collected through questionnaires distributed to commercial bank's financial management departments, and also by analyzing listed banks' financial statements. The study indicates that financial technology adoption has revealed a statistically significant impact on commercial banks' total deposits, total loans and net profit margin. The findings of this study will be beneficial for clients as they can become more aware of technological financial

transactions, and for banks as they apply and use financial technology in order to enhance related financial indicators.

The main findings of this study are consistent with those of previous research to a certain extent. Ibrahim (2018) revealed a positive and significant influence of FinTech on financial performance. Dwivedi et al. (2021) exposed that the adoption of FinTech has a direct impact on banking industry performance. Another study by Abbas and Shaheen (2021) reported that FinTech plays a significant role in the banking sector. Although the research objective has been achieved, we believe that there are still other variables that can be added. Therefore, future studies can rely on research scope and specific conditions, to add other variables to comprehensively assess the impact of financial technology on improving banks' financial performances. Expanding the sample size in future studies also makes the research results more reliable.

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