


The Effect of The Financial Technology on Jordan's Commercial Banks Performance

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Abstract: Objectives: The paper is aimed at investigating the effect of financial technology “FinTech” on the performance of the commercial banks in Jordan. It is designed to help local banks to evaluate the use of “FinTech” to enhance performance. The importance of this study came at a time of rapid reliance on “FinTech”. It highlights the banks’ role in adopting up-to-date financial technology to improve banking performance. **Methods:** The structural equation modeling (SEM) approach was used to analyze the questionnaire data for this study using (AMOS-24) program to assess the relationship between four key independent variables: (Electronic payment services (EPS), financing (FIN), remittances (REM), & lending (LEN)) and bank performance (BPRF). **Results:** Analyzing the mediating role of financial performance (FPRF) in the relationship between (EPS, FIN, REM, and LEN) and (BPRF), the results revealed a positive and significant indirect effect of (REM) and (LEN) on (BPRF). In contrast, (EPS) and (FIN) were found to have insignificant indirect effects. Furthermore, the direct effects of (FIN), (REM), and (LEN) on (BPRF) were also positive and significant, while (EPS) remained insignificant. **Results:** The results revealed that (FIN), (REM), and (LEN) had a positive and significant effect on bank performance (BPRF). However, the relationship with (EPS) was found to be insignificant. **Findings:** The paper concludes that (FIN) and (BPRF) are directly and fully associated. In addition to partially mediating (FPRF), (REM) and (LEN) exhibit total, direct, and indirect effects on (BPRF). **Recommendations:** In an effort to encourage future research using Structural Equation Modeling (SEM), the study recommends employing the same variables as a baseline for measurement. This approach can assist local banks in assessing how FinTech enhances their operational performance. Furthermore, the study highlights the importance of continuously developing and updating (EPS). Both (REM) and (LEN) should be considered key indicators of bank performance, while positive (FIN) outcomes should be viewed as significant measures of a bank’s overall success.

Keywords: FinTech, finance, financial institutions and services, Commercial Banks, performance, SEM.

Jel classification: G21. O33

أثر التكنولوجيا المالية على أداء البنوك التجارية الأردنية

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ملخص: الأهداف: تهدف هذه الورقة إلى دراسة تأثير التكنولوجيا المالية على أداء المصارف التجارية في الأردن. وقد صممت هذه الدراسة لمساعدة المصارف المحلية على تقييم استخدام التكنولوجيا المالية بهدف تعزيز أدائها. وجاءت أهمية هذه الدراسة في وقت يزداد الاعتماد فيه على التكنولوجيا المالية، إذ تسلط الضوء على دور البنوك في تبني أحدث التقنيات المالية لتحسين الأداء المصرفي. (AMOS-24) المنهجية: تم استخدام طريقة نمذجة المعادلات الهيكلية لتحليل بيانات الاستبيان لهذه الدراسة من خلال برنامج (AMOS-24) لتقييم العلاقة بين أربع متغيرات مستقلة (خدمات الدفع الإلكتروني، التمويل، الحوالات والإقراض) ومتغير الأداء المصرفي. **النتائج:** من خلال تحليل دور الأداء المالي كوسيط للعلاقة بين (خدمات الدفع الإلكتروني، التمويل، الحوالات والإقراض) من جهة والأداء المصرفي من جهة أخرى، أظهرت النتائج وجود علاقة إيجابية وذات دلالة إحصائية وأثر غير مباشر (للحوالات والإقراض) على الأداء المصرفي. في حين تبين أن المتغيرين (خدمات الدفع الإلكتروني والتمويل) ليس لهما أثر ذات دلالة إحصائية. وتبين أيضاً وجود أثر مباشر إيجابي وذو دلالة إحصائية لمتغيرات (التمويل والحوالات والإقراض) على الأداء المصرفي وبوجود متغير الأداء المالي، بينما لا يوجد أثر ذو دلالة إحصائية لخدمات الدفع الإلكتروني على الأداء المصرفي. **الاستنتاجات:** واستخلصت الورقة وجود علاقة كلية ومباشرة بين التمويل والأداء المصرفي وأن الأداء المالي توسط جزئياً العلاقة المباشرة وغير المباشرة بين (الحوالات والإقراض) والأداء المصرفي. التوصيات: في مسعى لحث الباحثين الآخرين بإجراء المزيد من الدراسات باستخدام منهجية نمذجة المعادلات الهيكلية، تقترح الدراسة استخدام نفس متغيرات هذه الدراسة كأساس للقياس. ويمكن أن تساعد هذه الطريقة البنوك المحلية في تقييم كيفية تحسين التكنولوجيا المالية لعملياتها المصرفية، كما تؤكد الدراسة على مدى أهمية التطوير المستمر والتحديث لخدمات الدفع الإلكتروني، واعتبار الحوالات والإقراض مقياسين رئيسيين للأداء المصرفي بالإضافة إلى اعتبار النتائج الإيجابية للتمويل مؤشرات مهمة لأداء البنك بشكل عام.

الكلمات المفتاحية: التكنولوجيا المالية، التمويل، المؤسسات والخدمات المالية، البنوك التجارية، الأداء، نمذجة المعادلات الهيكلية.

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Introduction

Societies were formed early in human civilization. Transparency, trust, and mutual interest served as the cornerstones of their lives, Services have undoubtedly been used since the dawn of civilization, and innovation is ongoing, Given the exciting new technologies available to us today, it is clear that artificial intelligence (AI) will dominate every sector of products and services, impacting our daily lives, We will continue to experience changes and we should accept it and live with it since we cannot avoid it in the interim (Arjunwadkar, 2018).

These days, we live in a dynamic world of financial technology, or "FinTech." which refers to the quickly expanding financial sector, it is rapidly evolving and effectively integrates with the financial processing system (Gomber, *et al.*, 2018). Financial services are becoming more automated and decentralized as a result of "FinTech's" ongoing success with businesses. The world economy is greatly aided by emerging technologies in this context. It can be characterized as a rapidly expanding and complex sector.

The current era is characterized as a changing business environment based on changes in consumer behavior which is changing quickly as a result of financial innovation, which also opens up new financial channels. It was characterized by a swift uptake of new technology by both institutions and consumers, which quickly altered consumer behavior. These modifications opened the door for sophisticated and useful innovations in the financial sector, like the ability to conduct remote banking using particular applications that required downloading to your smartphone (Greenspan & Fox, 2015).

This behavior brought about by easy access to the internet and widespread use of smartphones, which can connect to financial institutions online. Its vast usage potential and

internet accessibility are anticipated to boost perfect competition in homogeneous organizations and offer better services to satisfy users. As smartphones have become more popular, technological advancements have made it easier to conduct financial transactions using this new tool. Due to the phones' quick global adoption, users have more freedom and save more time when conducting their regular financial transactions (Abrahamo *et al.*, 2016). Adoption of smartphones indicates that consumers are using these gadgets as a new way to access the internet in order to obtain quick and easy financial services. Customers are actually happy with the technology that has been invested in internet usage, including smartphones and various computers that offer data and information to satisfy people (Nicoletti, 2017). However, this will cause cutting-edge technology to take over the business world, progressively replacing outdated, conventional business practices (Abdul Rahman *et al.*, 2022).

The primary domains of "FinTech," such as (AI) and internet-related concerns are introduced by Lai *et al.* (2020). By using an (AI) tool specifically designed for the financial sector, these "FinTech" segment combinations can be guided and adhered to by customers as trends required for services.

Startups are international "FinTech" companies that offer the financial sector new technological services as substitutes for established ones. These services are also designed to satisfy the needs of the banks' customers. Long-term viability and market retention for these companies rely on their ability to stay up to date with contemporary technology, its direct application in the business sector, and continuity. Nonetheless, the banking sector is becoming more and more dependent on technology. Efficiency and productivity will increase in this dynamic

environment if professional "FinTech" companies and the banking industry work together and make appropriate use of this modern technology. The global financial institutions, including Jordanian local banks, are cognizant of consumer demands and market conditions in order to preserve positive and intimate client relationships. As a result, staying current with business models is crucial to their survival, and the number of customers is the primary determinant of such businesses' success." It is highly anticipated that the competitors in this field will develop and enhance the services provided to the banking sector.

When the financial institutions, including banks, implement such a process, objectives are regularly achieved. You won't be able to return to outdated, conventional models and procedures once you start utilizing "FinTech" services. Instead, you move forward with the development of these technology models in order to enhance and effectively and successfully compete with other financial institutions. The only way to overcome financial obstacles is to advance toward better digital transformation swiftly and unreservedly.

These "FinTech" objectives are to identify and enhance methods of using the financial sector (Investopedia, 2023).

By either developing "FinTech" services internally with their own hired technicians or by acquiring the services from companies that specialize in banking technology, the majority of major banks that adopted "FinTech" earlier in their business have won the race (Rory, 2018). Arner *et al.* (2015) state that "FinTech" can be separated into three stages:

Stage one (1886–1977) financial services are supported by US infrastructure. The transatlantic cable was established in 1866, and

Fedwire, a telegraph and Morse code fund transfer system, followed in 1918.

Stage two (1967–2008) one significant step that signaled the beginning of a new era of digitalization in finance rather than an analog system was the creation of the first ATM by Barclays in 1967. The 1970s saw the creation of the NASDAQ, the availability of electronic stock trading, and the introduction of SWIFT for money transfer transactions between banks and other financial institutions.

Stage 3 began in 2008 and is still going on today. In 2009, Bitcoin became the first crypto currency to use blockchain technology.

Kou *et al.*, 2024 divided "FinTech" into three stages: emergence (1977–2008), fermentation (2009–2017), and takeoff (2018–present), furthermore, he stated that "FinTech" research in the financial sector can also be separated into four research streams: online banking and payment technology, blockchains and crypto currency, automated and analytic trading, and lending & capital raising.

The National Digital Transformation (2021–2025) is a five-year plan that the Jordanian government has started. This strategy's main objectives are to encourage social and political stability, boost entrepreneurship, and boost economic growth. It is supported by a number of pillars, such as digital platforms, citizen service, cyber security, electronic payments, data management, and infrastructure to facilitate digital transformation. The digitalization of government payment services, which entails utilizing contemporary technology to convert conventional government payment procedures into digital formats, is a fundamental element of this strategy. Increased efficiency, reduced expenses, enhanced transparency, and accelerated and streamlined payment procedures are the objectives of this change. It includes a range of digital platforms and

payment methods for both citizens and businesses. Taxes, fees, and other government services can be accessed online or through mobile applications. The available payment methods include smartphone payments, e-wallets, online bank transfers, and QR code-based transactions (MODEE, 2025).

The strategy led to the establishment of the Jordan "FinTech" Center (Jo-Fintech) by the Central Bank of Jordan (CBJ) in September 2022. The center's goal was to create a cohesive ecosystem that encourages leadership and innovation in Jordan's financial sector.

Through cooperation between important stakeholders, JO-Fintech seeks to achieve the vision of a flourishing financial technology landscape. Supporting the expansion of the "FinTech" industry in Jordan, utilizing experience, improving digital financial services, strengthening the foundational digital infrastructure, and continuously assisting "FinTech" entrepreneurs and startups are some of its goals (CBJ, 2025).

The Jordan Payments and Clearing Company (JoPACC) is a private "FinTech" startup that was established in 2017 as a result of a joint venture between CBJ and all 21 of the nation's commercial banks. In Jordan's national payments system, JoPACC, a private shareholder company, is essential to the development and management of a variety of financial services and products. It offers cutting-edge digital financial solutions that improve end users' experiences and support the expansion of the nation's digital financial services ecosystem as a whole. In order to assist the industry and promote financial inclusion, JoPACC also produces knowledge. The JOIN Fincubator, a dedicated "FinTech" incubator that supports the development, testing, and production of new "FinTech" goods and services, is one of its main projects. Commercial banks and payment service

providers (PSPs) are among its customers; they rely on the business to provide dependable and effective financial services to end users (JoPACC, 2025).

A number of important financial services and platforms are part of Jordan's national payments system. These consist of:

1. The Instant Gross Settlement System (IGS) is a wholesale payment system that facilitates transactions between parties, especially settlements of other payment systems across the nation, as well as local commercial banks.
2. Automated Clearing House (ACH): This system manages individual bank account transactions and enables large-scale electronic salary payments.
3. Electronic Check Clearing System (ECS): an electronic check payment processing system.
4. The interoperability of ATM services nationwide is made possible by ATM networks, such as JoNet.
5. E-Fawateercom: a popular electronic bill presentation and collection system.
6. CliQ: an instantaneous transfer service for small-value and micropayments between bank accounts and between bank accounts and e-wallets. It is compatible with the point-of-sale (POS) and JoMoPay systems.
7. JoMoPay: a mobile electronic system designed for small- and micro-value transactions. People outside of the official banking industry are its main clientele. JoMoPay connects Jordan's e-wallets, allowing for financial transactions between them as well as between e-wallets and bank accounts.
8. (POS) payments: companies use these to electronically collect payments through card transactions. All of the main international card networks are supported by Jordan's

POS system (CBJ, 2023). CliQ, JoMoPay, e-Fawateercom, ACH, and ECCU are the five main payment systems that JoPACC runs. The company established JOIN Fincubator, a "FinTech" incubator that supports the development, testing, and production of "FinTech" goods and services, in keeping with its mission to promote financial innovation (JoPACC, 2025).

Definition

There isn't a universal accepted definition of "FinTech". The "FinTech" sector is developing so quickly that it's still difficult to come up with a broadly accepted definition. Through software and applications, "FinTech" is used to assist clients and the financial industry in improving and streamlining financial operations, procedures, and consumer lives. The term "FinTech" was first used in the 21st century to describe technology associated with well-known financial institutions, like banks. These days, "FinTech" can refer to a variety of programs, including but not limited to retail banking, investment management, crypto currency, and fundraising. (Investopedia, 2023).

One of the researchers of this paper (Nsour, J.) has developed a new and simple definition for "FinTech" which is "**in-hand technological instruments employed for financial services**". Others described it in different ways, but with relative meaning.

The Financial Stability Board (FSB, 2024) defines "FinTech" as innovation in financial services that is enabled by technology markets & institutions and has the potential to create new business models, applications, processes, or products. These innovations can have a significant impact on financial markets and the overall provisions of financial services.

"FinTech" is defined as the provision of financial products or innovative financial services (Ratecka, 2020). It is also involved

sophisticated technology (Knewton & Rosenbaum, 2020). Other researchers link "FinTech" to companies that provide technological solutions (Laidroo *et al.*, 2021). Additionally, "FinTech" exhibits novel business strategies that have the potential to improve the financial markets (Li & Xu, 2021).

The phrase "modern relationships between business activities and internet-related technology in financial services" has been used by other scholars (Suryono *et al.*, 2020). This is commonly described as the use of applications, software, and digital platforms to deliver services to consumers through digital devices such as smartphones. (Morgan *et al.*, 2019). It is also an application of technology to finance and is further referred to as technology-enabled financial solutions (Arner *et al.*, 2015).

Chuen & Low (2018) described it as a technologically driven solution that showcases innovation in software applications that incorporate models and procedures in the financial sector in a broader sense, it is also described as a broad category of technological applications that provide financial services like, investment, processing, electronic payments, finance and insurance. Others call this type of technology used by professional companies "FinTech". In the long run, it is intended to eventually be designed to replace the conventional financial method of offering services to customers (Lin, 2015).

According to Deloitte (2015) the goal of "FinTech" is to increase efficiency and play part in developing new financial business models by leveraging blockchain, artificial intelligence, data, and cloud analytics. Additionally, it is a helpful technology for the financial industry, which includes marketing, payments, financial management, insurance, and deposit and lending transactions.

Study Problem

The study focuses on how Jordanian commercial banks are implementing "FinTech". Thus, the study uses "FinTech" to improve and add to the literature on bank performance. Thus, the following questions are discussed by the researchers:

Primary question

Does "FinTech" affect the performance of local commercial banks?

Secondary questions

- Do electronic payment services as part of "FinTech" affect the performance of local commercial banks?
- Does financing as part of "FinTech" affect the performance of local commercial banks?
- Do remittances as part of "FinTech" affect the performance of local commercial banks?
- Does lending as part of "FinTech" affect the performance of local commercial banks?
- Does financial performance mediate between "FinTech" and bank performance?

Study Importance

The study's significance stems from the development of new "FinTech" technology and its implications for financial operations and transactions, which directly affect local commercial banks' performance. As part of the financial sector, the paper emphasizes the role of local commercial banks in implementing modern "FinTech" to enhance performance.

Additionally, by presenting a novel fusion of business and finance constructs to evaluate performance using a structural equation model (SEM), this study adds to the body of literature. The results highlight how technological innovation can be used to address "FinTech"-related issues and how they affect Jordanian banks' performance.

Study Objectives

The objective of this paper can be summarized into the following concepts:

- Knowing the impact of "FinTech" on financial transactions in local commercial banks.
- Knowing the bank's employees' responses to "FinTech" and the extent of its contribution to improving the bank's performance.
- Demonstrating the importance of partnerships with "FinTech" firms, as they play an important role in facilitating financial operations.
- Knowing the mediating role of financial performance between "FinTech" and banking performance.

Literature review

Within the banking sector, "FinTech" can be divided into four primary categories: online banking and payment solutions, financing tools & capital sourcing, banking performance, and blockchain & crypto currency.

Researchers examine how "FinTech" can enhance the financial sector and customer experience while highlighting its social role (Joia & Proenca, 2022). (Tanbour *et al.* 2025; Chen *et al.*, 2023; Danbolt *et al.*, 2022; Thakor, 2020) have all drawn significant attention to the emerging field of "FinTech" research due to the financial industry's rapid technological advancement and its growing relevance in the modern economy. Our recently developed original theme, which connects "FinTech" to bank performance, has not been fully explored despite the abundance of studies on the subject.

Some scholars focus on online banking and payment solutions. In contrast, Bany Mahmmad *et al.* (2022) assess the organizational, technological, and environmental elements that influence banks' use of intelligence and analytics. Bureshaid *et al.* (2021) look into the factors that affect the adoption of "FinTech" services and the risks

they pose to banking customers. Purnomo & Khalda (2019) also look at the advantages and disadvantages of "FinTech" and how it impacts the financial sector. These studies present the "FinTech" scene from multiple perspectives using a range of methodologies.

Research by Leong & Sung (2018) indicates that "FinTech" is a game-changing technology. Their article explains what they mean by looking at a range of "FinTech" applications, such as funding, advisory services, payment methods, and regulatory compliance. Their article goes into detail about what they call "FinTech" innovations that create value for businesses. Similarly, Abrahao *et al.* (2016) investigate the adoption of mobile payment services using the unified theory of acceptance.

Other researchers focus on capital acquisition and funding instruments. Basalat *et al.* (2023) assessed financial performance using equity and return on assets and provided insights into several metrics that demonstrate the relationship between governance and financial performance. Nour & Al Momani (2021) looked at the relationship between return on equity (ROE) and human capital (HC) for Jordanian commercial banks and discovered that intellectual capital was the most significant factor, while HC had no appreciable impact on ROE. Abu Karsh & Abufara (2020) highlight the role that "FinTech" companies play in modernizing and enhancing traditional banking practices in their assessment of the "FinTech" landscape in relation to the banking sector. They forecast a rapid rise in the number of "FinTech" businesses and note a strong correlation between "FinTech" and banks' profits. The difficulties and possibilities presented by "FinTech" in Jordan's banking industry are examined by Al Ajlouni & Al-Hakim (2019).

A number of academics concentrate on bank performance. Al-Koni *et al.* (2025) draw

attention to the effect that professional committees have on the financial performance of banks in Jordan and Palestine that are listed on both stock exchanges. Rabaia *et al.* (2025) predict company insolvency and examine the effects of corporate governance practices and board director characteristics. Tanbour *et al.* (2025) also describe how internal control frameworks assist in reducing risks during difficult times. The moderating effect of corporate governance on the correlation between credit risk and the banking industry's financial performance is examined by Mohammad *et al.* (2024). These studies offer diverse viewpoints on the "FinTech" landscape by utilizing a range of methodologies. Bashayreh and Abu Wadi (2021) assess how professional committees affect the performance of Jordanian banks in relation to "FinTech" services. This study focuses on return on equity as a key indicator of banking performance, while also evaluating other variables such as GDP, bank size, and leverage. Among the "FinTech" elements that were looked at were ATM services, smartphone apps, and online banking. Information technology has a significant impact on overall efficacy, according to Jalal-Karim & Hamdan (2010), who also discuss strategies to improve banking performance. Furthermore, Quddus (2020) looks at the "FinTech" sector, highlighting the importance of innovative technologies in improving services and reducing business risks. The purpose of this study is to highlight the inadequacies in the banking technology infrastructure that accompany the emergence of "FinTech." More research has tried to compile discussions around "Fintech" technology, as demonstrated by Abbad (2011), who studied electronic banking in Jordan and identified important factors influencing behavior and information technology. He concluded that societal norms, internet accessibility, security, trust, subjective norms, and user-friendliness

are all significant factors. A Numerous study, including those by Varma *et al.* (2022) and Alsmadi *et al.* (2022), have examined blockchain and cryptocurrencies. Varma looks into how financial technology affects the risks and challenges that banks face, with a particular emphasis on blockchain technology. Alsmadi investigates the function of "FinTech" in Jordan's banking sector and find that, among other aspects pertaining to the banking system, its use is positively correlated with elements such as social influence and customer trust. Their findings indicate that "FinTech" is crucial to the banking industry, with all facets of financial technology, including blockchain and artificial intelligence, poised to propel the industry forward.

This study is considered necessary to fill the current research gap. According to the researchers' knowledge, no existing studies have investigated the complete, direct, and indirect effects of financial technology on the performance of banks in the Jordanian context.

Hypotheses

This study evaluated the mediation role of financial performance (FPRF) in the relationship between financial technology, or "FinTech" and bank performance (BPRF). The following hypotheses were developed.

H1: There is a positive relationship between electronic payment services (EPS) and bank performance (BPRF).

H2: There is a positive relationship between financing (FIN) and bank performance (BPRF).

H3: There is a positive relationship between remittances (REM) and bank performance (BPRF).

H4: There is a positive relationship between lending (LEN) and bank performance (BPRF).

Mediation

H1.1: Financial performance mediates the relationship between electronic payment services (EPS) and bank performance (FPRF).

H2.1: Financial performance mediates the relationship between financing (FIN) and bank performance (BPRF).

H3.1: Financial performance mediates the relationship between remittances (REM) and bank performance (BPRF).

H4.1: Financial performance mediates the relationship between lending (LEN) and bank performance (BPRF).

Methodology

Population and Sample

This study investigates the impact of "FinTech" on the performance of Jordan's commercial banks using SEM analysis.

Employees from all twelve banks that hold commercial bank licenses from (CBJ) are included in the study population. Foreign and other Islamic banks were not included in the sample. Arab Bank PLC, Arab Banking Corporation (Jordan), Bank of Jordan PLC, Cairo Amman Bank, Capital Bank of Jordan, the Housing Bank for Trade & Finance, Jordan Kuwait Bank, Jordan Hail Bank PLC, Arab Jordan Investment Bank, Invest Bank, Bank of Eithad, and Jordan Commercial Bank are among the banks that are part of the sample.

Instrument

For statistical analysis, we employ a five-likert scale. IBM SPSS-24 and AMOS-24 were used for the analysis. To test the study's hypothesis and determine the relationship between "FenTech" and bank performance, a multivariate statistical analysis called structural equation modeling (SEM) was conducted. There are 35 items total in the survey questionnaire, which is divided into three sections: statements about personal and professional data, independent and dependent variables. Refer to (Appendix A).

Data for the study was gathered via a questionnaire using survey research. The study involved 360 bank employees. A questionnaire with 35 items was used to gather the sample. 289 were valid for statistical analysis.

Measurement model

Conceptual Model

The conceptual model is shown in Fig. 1. It comprises six latent variables linked to various observed items that the model will measure. “FinTech” has four exogenous variables that differ from a study developed by Bosbatah (2020). He uses basic analytic statistics to examine three different variables for “FinTech”. While we use structural equation modeling (SEM), we assume there are more variables and items to be observed. We use exogenous variables “electronic payment services (EPS), financing (FIN), remittances (REM) and lending (LEN)” in addition to endogenous variables consisting of financial performance (FPRF) and bank performance (BPRF). At the same time, we think that the adoption of a new measurement scale will enhance more reliable future studies. On the other hand, we believe that using a new measurement scale will improve future research in this area that is more trustworthy. As far as we are aware, no one has used this type of measurement scale.

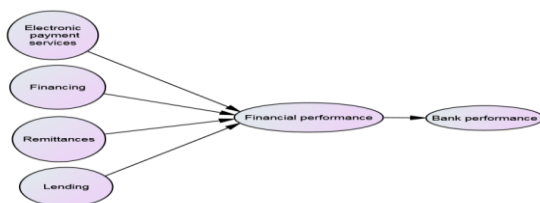


Figure (1): the conceptual model.

Normality

It is essential to check for the normality of items before we proceed with confirmatory

factor analysis (CFA). At the same time, it is also necessary to perform exploratory factor analysis (EFA) for this study. We have checked for multivariate and univariate normality tests. All p-values are less than 0.05, which rejects the null hypothesis of normality.

Reliability and validity

EFA

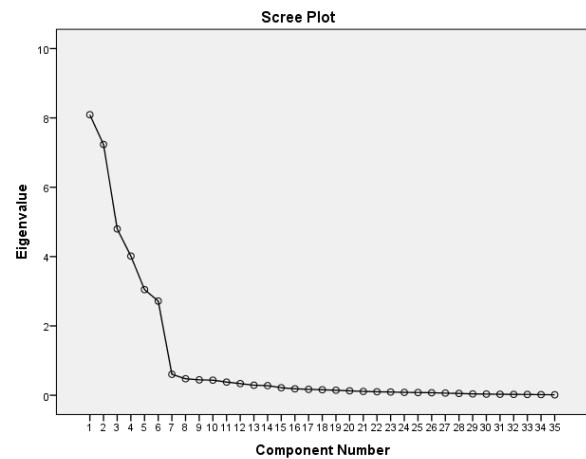


Figure (2): Screen Plot analysis.

An (EFA) was performed to ensure the internal reliability of the factors and their measures, as well as to further ensure the self-developed indicators are valid and reliable. A principal component analysis and varimax rotation were used. The minimum factor loading criteria was set to 0.50. The communality of the scale, which indicates the amount of variance in each dimension, was also assessed to ensure acceptable levels of explanation. The results show that all communalities were over 0.50. An important step involved weighing the overall significance of the correlation matrix through Bartlett’s Test of Sphericity, which provides a measure of the statistical probability that the correlation matrix has significant correlations among some of its components. The results were significant: $\chi^2(n = 289) = 15185.234$ ($p < 0.001$), which indicates its suitability for factor analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy (MSA), which indicates the appropriateness of the data for factor analysis, was 0.865. In this regard, data with (MSA) values above 0.800 are

considered appropriate for factor analysis. Finally, the factor solution derived from this analysis yielded six factors for the scale, which accounted for 85.45 per cent of the variation in the data (Fig.2).

Three items were dropped: Q1, Q9, Q11 (i.e. Q1 “Financial technology, through electronic payment services, contributes to saving time and effort” due to the failure of loading on any dimension significantly. Q9 “The bank's financing increases by using electronic services” and Q11 “The use of ATM help to access financial sources and increase its operations at low cost” loaded onto other factors other than its allocated factor). Hence, these three factors were dropped from any further analysis.

Factor 1 Electronic payment (EPS) includes 7 items, Q2–Q8. Factor 2 financing consists of 6 items, Q10 & 12–Q16. Factor 3 covers 6 items Q17–Q22, referring to remittances Factor (REM). Factor 4 consists of 5 items, Q23–Q27, forming the lending factor F(LEN). Financial performance (FPRF) refers to factor 5 and has 4 items Q28–Q31. Finally, factor 6 refers to bank performance (BPRF) with 4 items, Q32–Q35.

CFA

We also performed confirmatory factor analysis (CFA). Table 1 presents the standardized factor loadings of the CFA model, which indicate that (p value < 0.001) is statistically significant. In other words, the observed values reflect the latent variable of concern. Referring to Anderson and Gerbing, (1988), it confirms the convergent validity of the measurement model. The value of Cronbach's alpha (Cronbach, 1951) for the survey was ($\alpha = .871$).

Reliability is the measure of the internal consistency of the constructs of the study. A construct is reliable if the alpha value is greater than 0.70 (Hair *et al.* 2013). Construct reliability was assessed using Cronach's alpha. The results revealed that electronic payment services EPS scale with 7 items ($\alpha = .978$). Financing (FIN) scale consists of 7 items ($\alpha = .968$). Remittances scale with 6 items ($\alpha = .968$). Lending with 5 items ($\alpha = .957$), the mediator variable scale consists of 4 items ($\alpha = .956$) and the dependent variable scale with 4 items ($\alpha = .925$).

Table (1): Measurement items and their reliability.

Constructs	Statement	Factor loading	CR	AVE	Cronbach's Alpha	
Electronic payment services (EPS)	Q2	EPS2	.930	.974	.834	.978
	Q3	EPS3	.984			
	Q4	EPS4	.919			
	Q5	EPS5	.911			
	Q6	EPS6	.951			
	Q7	EPS7	.907			
	Q8	EPS8	.776			
Financing (FIN)	Q10	FIN2	.860	.969	0.839	.968
	Q12	FIN4	.923			
	Q13	FIN5	.997			
	Q14	FIN6	.979			
	Q15	FIN7	.800			
	Q16	FIN8	.923			
Remittances (REM)	Q17	REM1	.912	.969	7.78	.968
	Q18	REM2	.860			
	Q19	REM3	.997			
	Q20	REM4	.959			
	Q21	REM5	.748			
	Q22	REM6	.999			

Constructs	Statement		Factor loading	CR	AVE	Cronbach's Alpha
	Q	Statement				
Lending (LEN)	Q23	LEN1	.996	.955	0.808	.957
	Q24	LEN2	.847			
	Q25	LEN3	.837			
	Q26	LEN4	.873			
	Q27	LEN5	.933			
Financial performance FPRF	Q28	FPRF1	.985	.940	0.798	.956
	Q29	FPRF2	.806			
	Q30	FPRF3	.923			
	Q31	FPRF4	.997			
Bank performance (BPRF)	Q32	BPRF1	.723	.963	0.866	.925
	Q33	BPRF2	.974			
	Q34	BPRF3	.909			
	Q35	BPRF4	.947			

$\chi^2(507) = 724.250$, TLI = 0.986, CFI = 0.987, RMSEA = 0.038, SRMR = 0.076.

Table (2): Divergent validity analysis.

Constructs	EPS	FIN	REM	LEN	FPER	BBERF
EPS	0.948086					
FIN	0.086	0.909968				
REM	-0.159	0.157	0.884098			
LEN	0.149	0.134	0	0.899179		
FPER	0.061	0.105	0.198	0.14	0.893657	
BBERF	-0.082	0.21	0.202	0.148	0.15	0.930832
AVE	0.83	0.84	0.78	0.81	0.80	0.87

Discriminant validity, or divergent validity, refers to the extent to which the measures should not be highly correlated with each other actually distinct. In order to statistically ascertain the individuality of the constructs, discriminant validity is established.

Fornell and Larcker (1981) suggest that the average variance extracted (AVE) should be greater than the variance between the construct and other constructs in the model (i.e., squared correlation between two constructs). Thus, the squared root of each latent variable (LV) should be greater than its correlation with any other (LV) in the assessment. From table 2 divergent validity of the latent variables is confirmed (Anderson and Gerbing, 1988).

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum \varepsilon_i}$$

Whereby, λ is the standardized factor loading for item i and ε is the respective error variance for item i . The error variance ε is estimated based on the value of the standardized loading as $\varepsilon_i = 1 - \lambda_i^2$.

$$AVE = \frac{\sum_{i=1}^n \lambda_i^2}{n}$$

Here, λ is the standardized factor loading of measurement item i , n is the number of items in a factor.

The measurement model is in a good fit as indicated by comparative fit indexes (CFI) and the Tucker-Lewis index (TLI) are above 0.90 as the level of acceptance, root mean square error approximation (RMSEA) and standard root mean square residual (SRMR) less than 0.08 according to (Hair, *et al.* 2010). So, the measurement model is set.

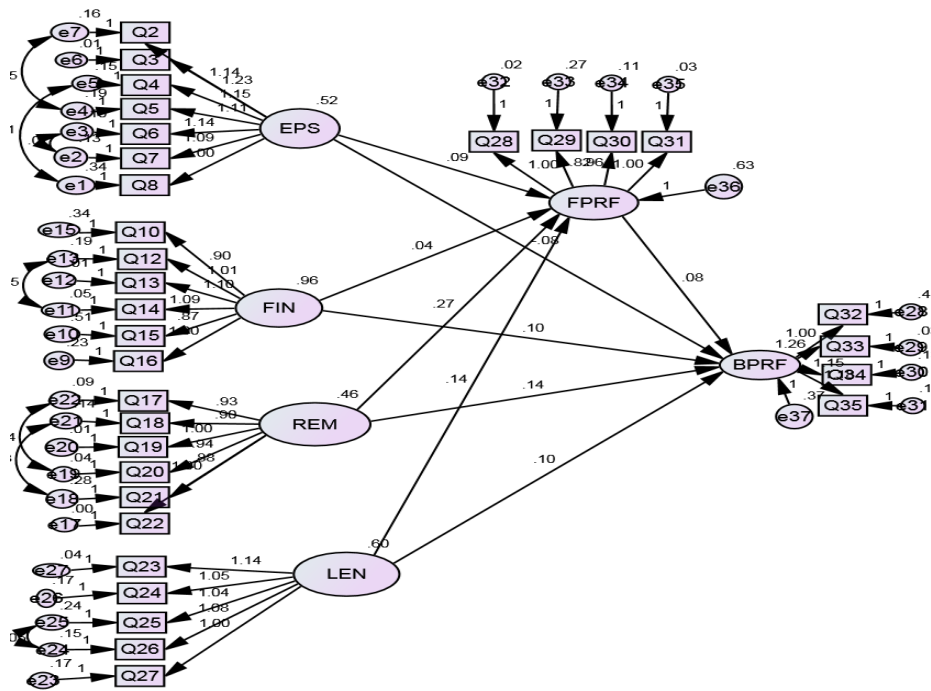


Figure (3): Structural equation model results.

Results

Total, direct, and indirect effects are the three key terms for effects in SEM.

Total effect is the sum of a variable's direct and indirect effects determines its overall impact on another. The direct effect is the immediate influence of one variable on another, whereas the indirect effect is the influence that travels

through one or more intervening variables (mediators) (Bollen, 1987; Sobel, 1987).

So, the total effect is the overall impact that includes both direct links and any mediated pathways

Based on the SEM model in fig. 3, a summary of hypothesis testing is shown in table 3.

Table (3): Summary of hypothesis testing.

	Hypothesis	Total effect	SE	t	P	Hypothesis	Direct effect	S. E	t	p	Indirect effect	SE	t	P	Conclusion
H ₁	Electronic payment services (EPS) ---> Bank Performance (BPRF)	.074	.045	-1.64	(.109) Not Sig	H _{1,1}	-.081	.044	-1.84	.066 Not Sig	.007	.008	0.875	.144 Not Sig	No relationship
H ₂	Financing (FIN) ---> Bank Performance (BPRF)	.106	.036	2.94	(.003) +Sig**	H _{2,1}	.103	.035	2.94	.004 +Sig**	.003	.005	0.6	.261 Not Sig	Direct relation
H ₃	Remittances (REM) ---> Bank Performance (BPRF)	.161	.061	2.63	(.003) +Sig**	H _{3,1}	.139	.059	2.35	.006 +Sig**	.022	.016	.125	.05 Sig*	Partial mediation
H ₄	Lending (LEN) ---> Bank Performance (BPRF)	.112	.051	2.19	(.009) +Sig**	H _{4,1}	.100	.052	1.92	.046 +Sig*	.012	.009	1.33	.044 Sig*	Partial mediation

Note: p*** < .001 p** < .01 p* < .05

Table (4): H₁ & H_{1,1}

	Hypothesis	Total effect	SE	t	P	Hypothesis	Direct effect	S. E	t	p	Indirect effect	SE	t	P	Conclusion
H ₁	Electronic payment services (EPS) ---> Bank Performance (BPRF)	.074	.045	-1.64	(.109) Not Sig	H _{1,1}	-.081	.044	-1.84	.066 Not Sig	.007	.008	0.875	.144 Not Sig	No relationship

Analysis was performed to assess the relationship between electronic payment services (EPS) and bank performance (BPRF). The results (see table 4) revealed that a significant effect of (EPS) on (BPRF) was found insignificant ($H_1: B = .074, t = -.164, p = .109 > 0.05$). This shows that there is no relationship between (EPS) and (BPRF). Hence H_1 was not supported.

Mediation analysis was performed to assess the mediating role of (FPRF) in the relationship between (EPS) and (BPRF). The results revealed that there was an insignificant indirect effect of (EPS) on (BPRF), ($H_{1.1}: b .007, t = .875, p = .144 > 0.05$). With the inclusion of the mediator, the direct effect of EPS on (BPRF) was still insignificant ($b = -.081, t = -1.84, p = .066 > 0.05$). This shows (FPRF) does not mediate the relationship between (EPS) and (BPRF). Hence $H_{1.1}$ also was not supported.

Table (5): H2 & H2.1

Hypothesis	Total effect	SE	T	P	Hypothesis	Direct effect	S.E	t	p	Indirect effect	SE	t	P	Conclusion
H ₂ Financing (FIN) ---> Bank Performance (BPRF)	.106	.036	2.94	(.003) +Sig **	H _{2.1}	.103	.035	2.94	.004 + Sig **	.003	.005	0.6	.261 Not Sig	Direct relation

The findings (refer to table 5) shows that Financing (FIN) has a positive and significant total effect on (BPRF) significant ($H_2: b = .106, t = 2.94, p = .003 < 0.05$). This demonstrates that (FIN) and (BPRF) have a positive relationship. Hence H2 was supported.

insignificant indirect effect on (BPRF) ($H_{1.1}: b .003, t = .6, p .261 > 0.05$). This demonstrates that H2.1 was not supported.

When the mediating role of (FPRF) in the relationship between (FIN) and (BPRF) was examined, the results showed that (FIN) had an

With the inclusion of the mediator, the direct effect of (FIN) on (BPRF) was positive and significant ($b = .103, t = 2.94, p .004 < 0.05$). This shows (FPRF) does not mediate the relationship between (FIN) and (BPRF); rather there is appositive and direct relationship.

Table (6): H3 & H3.1

Hypothesis	Total effect	SE	T	P	Hypothesis	Direct effect	S. E	t	P	Indirect effect	SE	t	P	Conclusion
H ₃ Remittances (REM) ---> Bank Performance (BPRF)	.161	.061	2.63	(.003) + Sig **	H _{3.1}	.139	.059	2.35	.006 +Sig **	.022	.016	.125	.05 Sig*	Partial mediation

The results (see table 6) results revealed a significant total effect of Remittances (REM) on (BPRF) was positive and significant ($H_3: b = .161, t = 2.63, p = .003 < 0.05$). This shows there is a positive and significant relationship between (REM) and (BPRF). Hence H3 was supported.

significant indirect effect of (REM) on (BPRF). ($H_{3.1}: b .022, t = .125, p \leq .05$) .H3.1 was supported.

Analyzing the mediating role of (FPRF) in the relationship between (REM) and (BPRF), the results revealed there was a positive and

Furthermore, the direct effect of (REM) on (BPRF) in the presence of the mediator (FPRF) was also found significant ($b = .139, t = 2.35, p = 0.006 > 0.05$). (FPRF) was partially mediated the relationship between (REM) and (BPRF).

Table (7): H4 & H4.1

Hypothesis	Total effect	SE	T	P	Hypothesis	Direct effect	S. E	t	P	Indirect effect	SE	t	P	Conclusion
H ₄ Lending (LEN) ---> Bank Performance (BPRF)	.112	.051	2.19	(.009) + Sig **	H _{4.1}	.100	.052	1.92	.046 +Sig *	.012	.009	1.33	.044 Sig *	Partial mediation

The results (see table 7) revealed a significant total effect of Lending (LEN) on (BPRF) was found positive and significant ($b = .112$, $t = 2.19$, $p = .009$). This shows there is a positive and significant relationship between (LEN) and (BPRF). H4 was supported.

Analyzing the mediating role of (FPRF) in the relationship between (REM) and (BPRF), the results revealed there was a positive and significant indirect effect of (LEN) on (BPRF) ($b = .012$, $t = 1.33$, $p = .044$) supporting H4.1.

Furthermore, the direct effect of (LEN) on (BPRF) in presence of the mediator was also found significant ($b = .100$, $t = 1.92$, $p = .046$). Hence, (FPRF) partially mediates the relationship between (LEN) and (BPRF).

Even though the EPS result was negligible, the paper will assist Jordanian commercial banks in improving their performance on three variables: (FIN), (REM), and (LEN). We discovered that "FinTech" had a positive impact on these variables.

As long as banks are eager to enhance these aspects in accordance with "FinTech," the findings of this study were highly anticipated. Customers found the bank's services, like the numerous financing offers shown in the mobile application, to be simple to use. "Click," a feature found in all Jordanian bank applications, is helping to rapidly increase the number of users with regard to remittances. However, local banks compete with one another to lend money by using the application rather than going to the bank in person. Each of these "FinTech" services had a positive effect on the bank's performance.

On the other hand, there is insignificant relationship between EPS and BPRF. In the direct effect case, the EPS's direct impact significance ($p = .066$) is lower than alpha 0.1 and marginally higher than 0.05. This is most likely because the clients' bank accounts and

financial market portfolios are not directly connected; they are distinct entities.

Conclusion

According to the study, "FinTech" and bank performance have a strong positive relation, which emphasizes how crucial it is to improve "FinTech" bank performance in order to maintain sustainability. By examining the impact of "FinTech," on the performance of Jordan's commercial banks, the study aims to close the research gap. It is intended to assist local banks in assessing how "FinTech" can improve performance. For this purpose, the findings confirmed that "FinTech" with three independent variables of this study {financing (FIN), remittances (REM) and lending (LEN)}, has a positive and significant total effect on bank performance (BPRF). But it was also found that electronic payment services (EPS) have no relationship with (BPRF). This means it has no total effect on (BPRF).

The mediating role of financial performance (FPRF) in the relationship between "FinTech" and (BPRF). It was found that there was a positive and significant indirect effect of two variables {REM and LEN} on BPRF. While (EPS) and (FIN) were insignificant. Therefore, (FPRF) partially mediated the relationship between (REM & LEN) and (BPRF) only.

The direct effect of {FIN, REM & LEN} on (BPRF) in the presence of the mediator (FPRF) was also found to be significant but insignificant for (EPS), the fact that (EPS) has no indirect effect through the financial performance (FPRF) mediator, its direct effect significance is 0.06, which is probably within the acceptable range if we consider alpha equal to (0.1). We believe that doubling the sample size for a subsequent survey will likely yield different results that could impact bank performance.

We can conclude that (FIN) and (BPRF) are totally and directly associated, although not

through mediator (FPRF). In addition to partially mediating (FPRF), {REM and LEN} have total, direct, and indirects effect on (BPRF).

Limitations

Future research should address the shortcomings of this study. We believe that the results of this study, which drew samples from twelve commercial banks in a developing country such as Jordan, might not apply to other regional or other developed countries. Additionally, Researchers can use a variety of “Fintech” indicators to assess bank performance. This will bolster the findings of the study.

Recommendations

It was not an easy task to deal with complex data. It requires patience and discipline. This paper's overall conclusion shows that financial technology has a significant impact on commercial banks' performance. The research suggests the following:

Further research in this area will be made possible by this paper. It should inspire other researchers to perform a survey-based SEM by using the same variables as a based-scale measurement. For additional analysis, new variables and questions may be added or changed.

This could investigate or validate a novel strategy for a more thorough comprehension of this type of research. The study can assist local banks in assessing "FinTech" to improve overall bank performance.

Disclosure Statement

- **Ethical approval and consent to participate:** All procedures performed in the study were in accordance with institutional and ethical standards.
- **Availability of data and materials:** The data and materials used in this study are

available from the corresponding author upon reasonable request.

- **Author contribution:** All researchers contributed equally to all phases of this study.
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