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Abstract: Financial Technology (FinTech) is a disruptive technology that creates an innovative cross-boundary ecosystem and helps banks and technological enterprises interact, cooperate and compete effectively. This can lead to improved Financial Services (FSs) for clients. This research examines the impact of FinTech characteristics on innovation and how they can transform the quality of financial services (QFS) based on the Theoretical FinTech DIPLOMA Model (Digital, Innovation, Pricing, Learning, Openness, Modernity, Agility) in the Jordanian banking sector. A descriptive analysis approach was applied in the study. Convenience sampling was applied to choose the participants, consisting of 208 employees from all of managerial levels in Jordanian banks. The findings revealed that the DIPLOMA model positively affects the QFS in the banking context. However, it has been found that Learning does not significantly affect the QFS. Based on the findings, it is recommended that future research is carried out across other sectors. In addition, a comparative study might give more information and insights about FinTech applications and their influence on the QFS.

Keywords: Financial Technology, Financial Services Quality, Transformation, DIPLOMA Model, Banking Sector.

1 Introduction

Any disruptive technology in the banking sector can lead to enormous transformations in financial services (FS) [1]. Karagiannaki, et al. (2017) provided facts about the advantages and obstacles presented by the digital revolution in the FS sector and examined how to achieve a deep understanding of all significant features when combining digital technologies with the traditional approach of doing work in the banking sector [2]. This transformational and technological change offers new opportunities for banks and their clients, and Karagiannaki, et al. mentioned that the main components of transformation are the business strategy, technology, innovation activity and regulation [2,3,4,5]. FinTech could be differentiated according to technological transformations in three sectors of finance: increasing, distributing, and transferring capital [6]. Wamba et al. (2019) summarized the benefits of FinTech as offering a strategic opportunity to expand novel financial digital services, comprehensive FS, trusted financial systems, improved financial market efficiency, additional reasonable FS, openings for new business models, easier access to finance, and reduced entry obstacles for new companies [7]. Based on that, the expansion of investment in FinTech is significant. According to Adomavicius et al. (2008), technology innovation includes components, products and services, and technology infrastructure [8]. FinTech simplifies the load on present FSs suppliers by revealing weak points in their existing business models [9,10]. In addition, studies have found that the important role of managers and decision-makers in efficiently introducing FinTech and novel FS affects the economic outcomes of crises and pandemics [11].

Nevertheless, despite the banking sector engaging in financial innovations, limited FS are adopting technological innovation [12]. In Jordan, FinTech is a comparatively novel approach that has been explored and studied by researchers and implemented by banks to improve the quality of FS and improve performance. This research intends to answer the following research question: What is the impact of FinTech on QFS in the Jordanian banking sector?

2 Literature Review

2.1 Financial Technology

Financial technology (FinTech) innovation is considered as a dynamic change to the banking sector, and includes new services that can be presented through online platforms [13]. There are rapidly transforming and developing technology within the FS sector [14]. Moreover, FinTech offers technologies and services that aim to completely change the existing structures and administration of the banking sector [15]. In addition, FinTech is defined as FS and solutions that are distributed via technology and which bring innovation to

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financial activities [16,17,18]. FinTech contains five key parts, which are: payments and infrastructure, customer interface, data security and monetization, finance and investment, and operations and risk management [16,19]. In addition, Anagnostopoulos (2018) concluded that FinTech embraces digital loan origination, crowdfunding financial platforms, digital reporting, financial advice, payment transfers, robotic financial transactions, virtual coins, payments completed through non-cash encrypted platforms and technical and robotic assistance through virtual space [10]. As a result, applying FinTech can lead to cost effectiveness, transparency of transactions, presenting convenient financial services [20,21] and can help organizations to gain a competitive advantage [7]. Putri1, et al., (2021) classified FinTech into four types; peer-to-peer (P2P) lending and crowdfunding; investment risk management; payment, clearing, and settlement; and market aggregator [22]. In addition, FinTech applications involve the utilization of specialized software and algorithms, computers, smartphones, blockchain, e-wallets, artificial intelligence tools (AI), and big data solutions that aim to improve and automate the delivery and use of FS and financial operations for all stakeholders [23,24]. FinTech services may be accessed by the public in a simple, practical, and secure manner, greatly assisting the general public in accessing banking FSs [25]. FinTech services can have a positive impact on the QFS, as well as improving consumer satisfaction and performance [26,27].

FinTech also offers benefits in managing resources and capital, such as providing an automatic advisory service and managing portfolios [28]. In general, the benefits of FinTech applications depend on a revenue-generating and cost-reduction perspective [29]. But the implementation of FinTech services is influenced by service trust, perceived ease of use, social influence, and perceived usefulness [13]. Putri1, et al., (2021) proved that price and income factors have an important impact on FinTech applications, but there is no effect of satisfaction, benefit, and convenience From FinTech applications [22]. Alwi, et al., (2022) found that FinTech adoption is influenced by management support, potential performance, expected effort, social influence, and, users' willingness [30]. Chhaidar, et al., (2022) found that the increasing amount of FinTech investment and the digital engagement of banks will increase profitability, performance, and the QFS, particularly in large bank [31].

On the other hand, FinTech can carry new challenges and risks, such as threats to data security, customer protection, cybercrime and financial volatility [19,32]. In addition, Arner et al. (2017), Teja (2017), and Milne (2016) summarized challenges associated with FinTech applications, such as instructions for access to banking platforms, cyber security, effectiveness of technology infrastructure, resilience, the hurried need for altering financial systems, cooperation, co-ordination with partners, lack of motivation, the network structure of banking, and a lack of agreed-upon standards [16,33,34]. Anagnostopoulos (2018) referred to the enablers of FinTech growth, which are high internet utilization, re-inventing business models, cost-efficacy, cyber safety, and financial crises [10].

2.2 Theoretical FinTech DIPLOMA Model

This study focuses on the DIPLOMA model (Digital, Innovation, Pricing, Learning, Openness, Modernity, and Agility). These dimensions are considered to be the best practices of FinTech [35]. According to the DIPLOMA model, FinTech shows that the seven distinct components of the DIPLOMA framework can produce innovative and significant value in the FinTech field. The DIPLOMA model extends the diplomacy approach formulated by Henisz [36]. Henisz presented patterns of achievement and failures that emphasize six essentials of best practice: due diligence, integration, personal, learning, openness, and mindset.

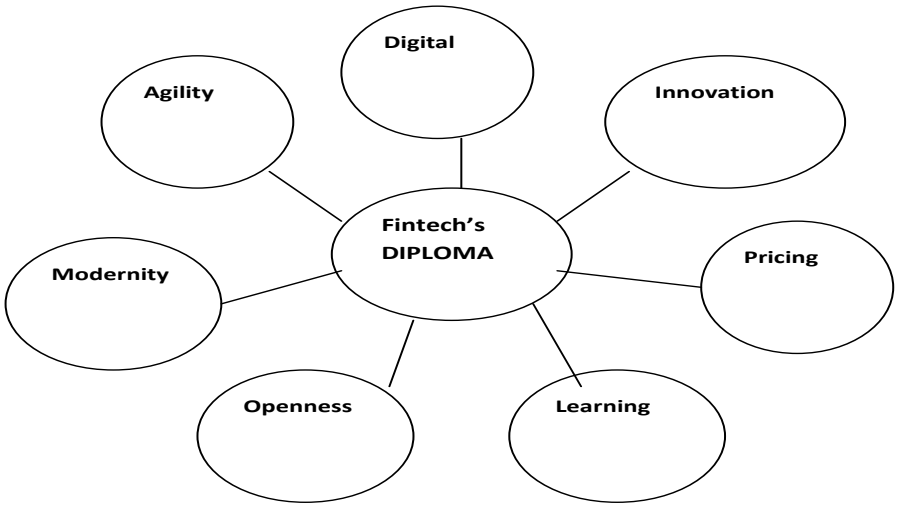

Fig.1: Theoretical model of FinTech's DIPLOMA [35].

2.3 The Quality of Financial Services.

Quality of services (QS) is crucial for all types of organization, because it plays a vital role in changing the market and maintaining customer satisfaction [37]. It is considered to be one of the most important strategies for banking organizations to ensure the continuous quality development of services and products, and to ensure customer satisfaction [38]. Parasuraman et al. (1985) claimed that QS is the difference between awareness of the level of service a customer has from their own service supplier company, and the anticipation he has from a superb company in a similar business [39]. In addition, Parasuraman et al. (1988) identified a five-measurement QS scale, named SERVQUAL (Tangibles, Responsiveness, Reliability, Assurance, Empathy) [39]. Zygiaris et al., (2022) found that there is a significant impact of SERVQUAL dimensions on perceived QS [41]. In addition, Vanniarajan and Elayaraja (2013) claimed that the significant QS of postal financial services are return, safety, empathy, accessibility, and value-added services [42].

Recently, Zygiaris et al., (2022) confirmed that the QS dimensions of empathy, assurance, reliability, responsiveness, tangibles, and prompt services lead to customer satisfaction [41].

Moreover, Dash et al. (2007) recommended that all members of a bank's management must focus more on responsiveness, assurance, and reliability to increase customers' satisfaction and loyalty by meeting their expectations [43]. FinTech is considered to be a development that has changed client expectations and financing approaches, and produces innovative, flexible, fast, and cost-effective financial services [44]. Gupta (2008) and Khan et al. (2009) assessed internet banking QS and stated that the main vital factors that affect client satisfaction are trust, confidentiality, accuracy, and reliability [45,46]. Singh and Kaur (2011) affirmed that the customer view of QS in banks is influenced by the accessibility of varied products and skilled employees, service time, tangibles, employees' behavior and skills, cost, technology, promotion and return [47]. Islam (2016) claimed that there is a significant relationship among QS, employee empowerment, and satisfied employees [48].

2.4 Proposed Model and Hypotheses

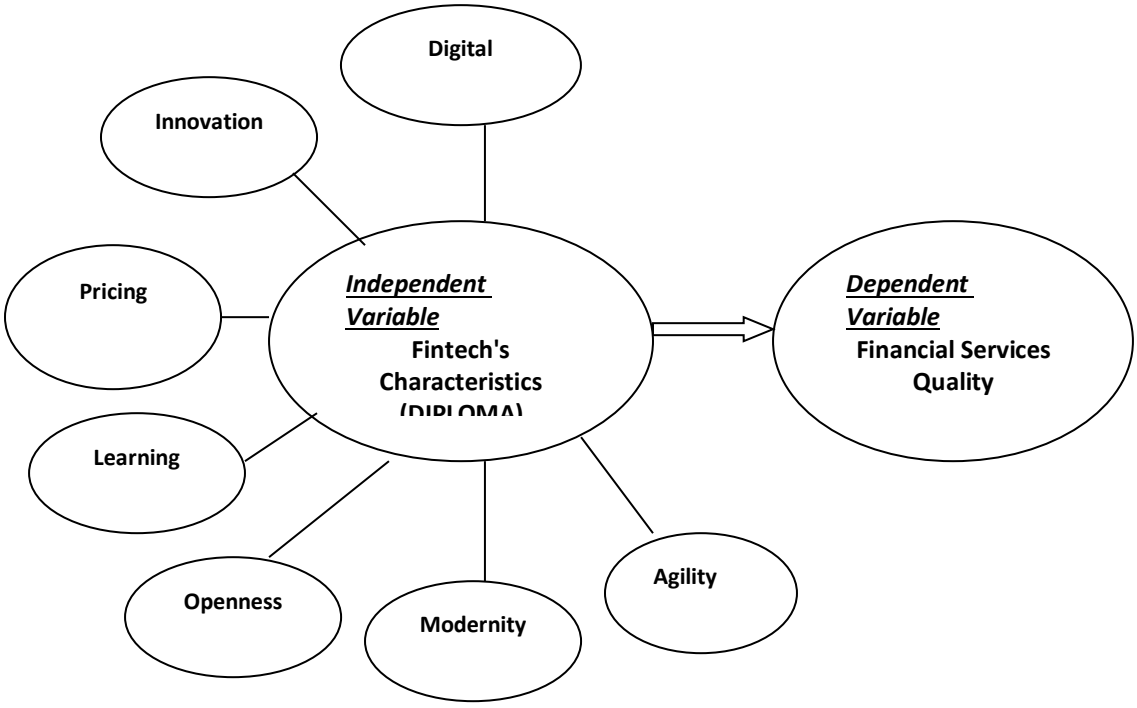

Fig.2: Proposed Model [Adapted from [35].

Hypothesis (H1). Financial Technology Characteristics (Digital, Innovation, Pricing, Learning, Openness, Modernity, Agility) have a positive effect on the Quality of Financial Services (QFS).
Hypothesis (H1.1). Digital has a positive effect on QFS.
Hypothesis (H1.2). Innovation has a positive effect on QFS.
Hypothesis (H1.3). Pricing has a positive effect on QFS.
Hypothesis (H1.4). Learning has a positive effect on QFS.
Hypothesis (H1.5). Openness has a positive effect on QFS.
Hypothesis (H1.6). Modernity has a positive effect on QFS.
Hypothesis (H1.7). Agility has a positive effect on QFS.

3 Methodology

A descriptive analytical research design was applied in this study. Convenience sampling was used to choose the sample population for the research. The total sample size selected for the study was 208 employees from the different levels of management in Jordanian banks. A questionnaire was used to collect the data from the employees.

The validity instrument was pilot tested on 32 respondents selected randomly. The pilot test result was based on the Pearson product-moment correlation coefficient. The pilot test showed that all the items of the initial questionnaire were all valid where the value indicated above the critical value 73 of 0.349 for 32 respondents based on the Pearson product-moment correlation coefficient. In addition, a reliability test was carried out to validate whether the data collection technique would result in consistent findings. Reliability was tested by using Cronbach's alpha (α), α = 0.70 to indicate reliability [49]. The statistical tools used in this research were Factor Analysis and Multiple Regression Analysis.

4 Data Analysis

4.1 Reliability

Table 1: Cronbach's Alpha for the Scales.

The variables	No. of Cases	No. of items	Cronbach's Alpha
Digital	208	4	.813
Innovation	208	4	.889
Pricing	208	4	.891
Learning	208	4	.727
Openness	208	4	.920
Modernity	208	4	.893
Agility	208	4	.932
Financial Services Quality	**208**	**15**	**.961**

Reliability is the accuracy of a certain measurement, and a reliable survey question gives the same results when managed frequently to the same populations or samples. Carmines and Zeller (1979) found that the identical loading must be more than or equal to 0.70 to recognize an indicator as measurement of a construct [50].

As shown in Table 1, the Cronbach's alpha of all the variables is between [0.727, 0.961] and is more than 0.70. The measurement of the study was acceptable in reliability because the Cronbach's Alpha coefficients of all constructs were above 0.7.

4.2 Validity

Table 2: Test of Construct Validity.

Factor	Item	Sig. (2-tailed)	Correlation of Item-to-Total	Factor	Item	Sig. (2-tailed)	Correlation of Item-to-Total
Digital	D 1	.000	.807**	Agility	A 1	.000	.921**
	D 2	.000	.803**		A 2	.000	.922**
	D 3	.000	.823**		A 3	.000	.912**
	D 4	.000	.773**		A 4	.000	.891**
Innovation	I 1	.000	.850**	Financial Services Quality	FSQ1	.000	.751**
	I 2	.000	.906**		FSQ 2	.000	.848**
	I 3	.000	.857**		FSQ 3	.000	.773**
	I 4	.000	.864**		FSQ 4	.000	.727**
Pricing	P 1	.000	.862**		FSQ 5	.000	.886**
	P 2	.000	.875**		FSQ 6	.000	.881**
	P 3	.000	.943**		FSQ 7	.000	.874**
	P 4	.000	.799**		FSQ 8	.000	.697**
Learning	L 1	.000	.771**		FSQ 9	.000	.696**
	L 2	.000	.724**		FSQ 10	.000	.831**
	L 3	.000	.678**		FSQ 11	.000	.760**
	L 4	.000	.704**		FSQ 12	.000	.853**
Openness	O 1	.000	.884**		FSQ 13	.000	.876**
	O 2	.000	.899**		FSQ 14	.000	.852**
	O 3	.000	.924**		FSQ 15	.000	.802**
	O 4	.000	.884**				
Modernity	M 1	.000	.901**				
	M 2	.000	.920**				
	M 3	.000	.864**				
	M 4	.000	.803**				

** Correlation is significant at the 0.01 level (2-tailed).

The researcher applied construct validity by calculating the correlation of item-to-total. Construct validity occurs if the

item-to-total correlations in this study all exceed 0.5 and all items are significant [51].

In this study, the correlation of item-to-total items is between [0.678, 0.943] and exceeds 0.5. All items were significant because (sig= .000 < 0.01). These results confirmed that each variable demonstrates properties of good validity. The fit of these models can now be assessed.

4.3 Normal Distribution of Data

Table 3: Skewness and Kurtosis Coefficients.

Variables	Skewness	Kurtosis
Digital	-2,153	5,016
Innovation	-1,724	4,220
Pricing	-1,675	3,475
Learning	-,915	,858
Openness	-1,352	1,393
Modernity	-1,409	1,691
Agility	-,814	-,149
Financial Services Quality	-1,500	2,797

Skewness and kurtosis are two approaches that can be used to assess the distribution of data and can identify normal distribution. Scores are considered to be moderately normal if they demonstrate skewness index values ranging between -3 and 3 and kurtosis values less than 7 [52].

Table 3 shows that the skewness ranges between [-2.153, -0.814]. It ranges from -3 to 3, and kurtosis ranges from -0.149 to 5.016. The kurtosis is less than 7. The outcomes of skewness and kurtosis coefficients show a normal distribution of data.

4.4 Test of Multicollinearity

Table 4: Tolerance and Variance Inflation Factor-VIF.

Variables	Tolerance	VIF
Digital	,308	3,248
Innovation	,160	6,254
Pricing	,151	6,639
Learning	,275	3,635
Openness	,577	1,732
Modernity	,387	2,583
Agility	,593	1,687

To analyze multicollinearity, two types of measurement can be used: the first is a variance inflation factor, and the second one is tolerance. All coefficients are within the agreed standards of a maximum of 10 for the variance inflation factor and a minimum of 0.1 for the tolerance [53].

According to Table 4, the overall independent variables' tolerance is between 0.151 and 0.593. It is above 0.1, and their variance inflation factor is between 1.687 and 6.639. It is less than 10, suggesting that there is no potential problem with multicollinearity.

To test the fitness of the study's model, the researcher used the analysis of variance. The result of this test is

represented in Table 5.

Table 5: Analysis of Variances.

Model		Sum of Squares	df	Mean Square	F	Sig.	R Square	R	Durbin-Watson
1	Regression	104,592	7	14,942	234,757	.000[a]	.891	.944[a]	1,879
	Residual	12,729	200	.064					
	Total	117,321	207						

4.5 Hypotheses Testing

variable (Financial Technology Characteristics). The p-value of the model is 0.000 and is < 0.05. The consequence is that the model is statistically significant. This proves the fitness of the model in explaining the QFS and also means that there are other variables that may influence QFS.

H1. "Financial Technology Characteristics (Digital, Innovation, Pricing, Learning, Openness, Modernity, Agility) have a positive effect on QFS" was validated.

Table 6 represents the results of the test of the main hypothesis by using the results of multiple regression analysis.

Table 6: The Results of Multiple Regression Analysis.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig. (2-tailed)
		B	Std. Error	Beta		
1	(Constant)	-.091	.116		-.785	.433
	Digital	.095	.043	.092	2,184	.030
	Innovation	.217	.055	.230	3,941	.000
	Pricing	.357	.057	.377	6,282	.000
	Learning	-.057	.057	-.045	-1,003	.317
	Openness	.106	.026	.124	4,051	.000
	Modernity	.169	.032	.195	5,217	.000

H1:1. “Digital has a positive effect on QFS” was validated, because: sig. (2-tailed) = 0.030 < 0.05 and the effect of the digital on the QFS equal 9.2%, because of standardized coefficients Beta = 0.092.

H1:2. “Innovation has a positive effect on QFS” was validated, because: sig. (2-tailed) = 0.000 < 0.05 and the effect of the innovation on the QFS equal 23%, because of standardized coefficients Beta = 0.230.

H1:3. “Pricing has a positive effect on QFS” was validated, because: sig. (2-tailed) = 0.000 < 0.05 and the effect of the pricing on the QFS equal 37.7%, because of standardized coefficients Beta = 0.377.

H1:4. “Learning has a positive effect on QFS” was invalidated, because: sig. (2-tailed) = 0.317 > 0.05.

H1:5. “Openness has a positive effect on QFS” was validated, because: sig. (2-tailed) = 0.000 < 0.05 and the effect of the openness on the QFS equal 12.4%, because of standardized coefficients Beta = 0.124.

H1:6. “Modernity has a positive effect on QFS” was validated, because: sig. (2-tailed) = 0.000 < 0.05 and the effect of the modernity on the QFS equal 19.5%, because of standardized coefficients Beta = 0.195.

H1:7. “Agility has a positive effect on QFS” was validated, because: sig. (2-tailed) = 0.000 < 0.05 and the effect of the modernity on the QFS equal 12%, because of standardized coefficients Beta 0.120.

5 Results

The extensive utilization of digital technologies and the current pandemic (COVID-19) have fueled the need and call for digital transformation to be introduced more widely into the banking sector. Recently, FinTech adoption has become widespread in the banking industry [55]. FinTech, is a combination of FS based on digital technology to increase the ability to sharpen, change, and accelerate FS [22]. To improve QFS, the Central Bank of Jordan has initiated many applications, such as a COVID -19 Response Challenge Fund to support accepting digital payments via e-wallets, digitizing cash transfer programs provided by the International Rescue Committee (IRC), deploying the Tanda application that provides ROSCA services digitally over digital wallets, which provides a digital saving platform, and the Mobile Money for Resilience (MM4R) Initiative. This research examines the impact of financial technology (FinTech) characteristics on innovation, and how it transforms the quality of financial services, based on the Theoretical FinTech DIPLOMA Model (Digital, Innovation, Pricing, Learning, Openness, Modernity, Agility) in the Jordanian banking sector.

There are a number of conclusions that can be drawn:

1) Digitization positively affects the quality of financial services (QFS), because the change of banks in the direction of digital services leads them to adopt radical transformations in their processes and activities. Digitization defines with great accuracy the ways in which banks present services to their customers and reduces the number of phases of service to a minimum. This also leads to expansion of the network and scope of transactions, and transactions are not limited to certain geographical boundaries. This results in an increase in responsiveness to customers’ needs, which is reflected positively on the QFS provided. In addition, there is increasing transparency in the processing of transactions, which increases

2) the quality of this type of service. This result agrees with Kapadia and Madhav (2020) who found that the expansion in digitization leads to an improved economy and enhances access to all types of FS [56].

3) Innovation positively affects the QFS, and this can be explained by the fact that innovation leads to the creation of diverse FS and products and new applications for online banking services. This then leads to a diversity of services offered to customers. This increases the opportunity for banks to respond quickly to changes in the needs of their customers. In addition, continuous innovation drives bank employees to work hard to find creative solutions to the problems facing customers, especially those associated with the efficiency of transactions, which increases customers’ confidence in the services provided to them and raises the bank’s credibility. These results agree with Regasa et al. (2021) that innovative actions have a significant impact on a company’s access to external financial resources [57]. There is also a strong positive correlation between FS and the innovation strategies of companies. Fuentes et al. (2015) stated that innovation has a positive effect on the quality of services and productivity [58].

4) Pricing positively affects the QFS, and the reason for this is that this type of service leads to lower costs, by reducing the time taken to complete transactions. The transactions are done automatically and using technology, which leads to a reduction in the number of employees and in related costs. This is what creates satisfaction for customers when comparing the prices of services and the level of quality. Moreover, rising competition in the banking sector guides companies to differentiate their FS and their pricing strategies. This agrees with Chang (2011) who confirmed that e-service pricing diminishes pricing complications by measuring and changing perceived e-service characteristics and quality to perceived value [59]. In addition, the results corroborate Zhao and Zhang’s (2019) claim that quality (pricing) flexibility is more valuable when clients are more responsive to service price (quality) [60].

5) Learning does not affect the QFS, and this is explained by the fact that learning is closely related to the experience curve in this field, which increases with the passage of time. On the other hand, this type of banking service is considered relatively new and novel in Jordan and the experience gained in it is low, and this is what has led to the absence of any learning having an impact on the QFS in the period assessed.

This impact can be expected to appear in the future with the upgrading of the experience of banks in these kinds of services. The results go against Pantouvakis and Bouranta (2017) who showed that the capacity of a bank to develop its quality of services is indirectly related to its learning culture [61].

6) Openness positively affects the QFS, and this result explains that openness requires sharing, delivering and transmission of information in ways that enhance customers' confidence in banking services and improves a bank's reputation. Banks must publish more accurate information because they are more responsible, and this offers more opportunities for customers to compare the services accessible by different banks at the same time. This prompts banks to pay more attention to improving the level of QFS provided to customers. This result agrees with Kim and Lee (2016) who explained that there is a positive relationship between openness, governance, economic growth, and quality of services [62].

7) Modernity positively affects the QFS, and this result is explained by the fact that banks are trying to keep pace with developments and progress in the banking services sector, and focus on adopting advanced policies to go in line with the future needs of customers. This is based on their current needs, as modernity is a necessary feature that must be provided to meet the changes that are happening in the business environment, and this is what made this variable a factor that supports the improvement of the QFS. This result agrees with Fotiadis and Vassiliadis (2013) who found that there is a positive effect of modernity and novel facilities on customer perception of the quality of services, but not to the level that they might be considered as a full service development [63].

8) Agility positively affects the QFS, and this can be explained by the fact that agility makes banks respond quickly to market requirements, as well as qualifies them to better use their resources and assets. Agility also ensures banks use their creative capabilities in better ways, and this leads to an increase in the capability of banks to provide more advanced services and advantages. This leads to the exploration of new applications that can provide customers with more advanced services, and this increases the QFS provided. This result goes against Qamar et al.'s (2021) results, which was a negative relationship between quality and flexibility, lean and being agile [64]. In addition, as confirmed by Pantouvakis and Bouranta (2017), banks must have the capability to be agile and adjust their structures and technology infrastructure to react, revolutionize and improve their services quality [61].

Recommendations

1) Improve banks' learning capabilities by benefiting from the experiences of leading banks in providing this type of service.

2) Support both modernity and agility by finding new technological applications and offering more advanced financial services. This can be done by building partnerships with research laboratories in universities.

3)Banks need to continuously develop the services provided in order to keep pace with the continuous changing needs of their clients, and this requires them to exploit their dynamic capabilities in effective ways.

4) Enhancing these types of FS through e-marketing, as the latter has rather low costs and can cover wide geographical areas.

Limitations and Future Research

This study is restricted to Jordanian banking only. In the future, it might be possible to study all service sectors, as well as other sectors such as manufacturing. In addition, a comparative study might give more information and insights about FinTech applications and their influence on the QFS.

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