



Virtual banking adoption: Challenges and opportunities from the perspectives of Jordanian

customers

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Abstract

Virtual banking represents a significant advancement in the banking sector, enabling banks to offer their services through digital channels such as online tools, applications, ATMs, phones, and internet communications, thereby eliminating the need for physical branch visits. However, the successful implementation of this virtual banking hinges on customers' perceptions and acceptance. Hence, this study focuses on the adoption of virtual banking in Jordan. This research examines the relationship between virtual banking and customers' intentions to use it in Jordan across four key dimensions: advantages, compatibility, simplicity, and trialability. Primary data were collected using a convenience sampling technique, with 130 participants responding to a structured survey. Subsequently, the collected data were analyzed using the SPSS tool (version 21) to extract both descriptive and inferential statistics. The results demonstrated a strong predictive capacity of independent variables in determining customer intention to use virtual banking. Furthermore, the study revealed significant positive correlations between advantages, compatibility, simplicity, trialability, and the intention to use virtual banking. Based on the findings, the study recommends that Jordanian banks should offer comprehensive banking services through digital platforms and incorporate various financial tools to cater to all customer needs. Ultimately, the adoption of virtual platforms possibly including ATMs should replace all in-person services provided by banks.

Keywords: Adoption, DOI, Intention to Use, Jordan, TAM, Virtual Banking.

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Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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1. Introduction

A bank is an authorized financial institution that provides various financial services for customers, including money depositing, issuing certificates of deposit, granting loans, exchanging currency, offering safe deposit boxes, credit card processing, reconciliation and reporting, and payment and investment solutions [1]. The banking sector serves a critical role in the economy due to its effects on market capitalization and liquidity. According to Pradhan et al. [2], banking is a key factor in economic development, especially in emerging nations. Banks foster financial sector development, promote capital flow, and ensure efficient resource distribution [3].

Global economic growth depends on a sound financial system that encourages effective saving and investing without barriers. Bank branches, which are the retail locations of commercial banks that offer financial services to customers, are expanding rapidly to provide customers with access to banking services with fewer barriers [4]. The growth of commercial bank branches worldwide is measured as the ratio between the number of branches and the number of adults; accordingly, as this value decreased, branch distribution increased. Fig. 1 shows that the global branch distribution increased between 2014 and 2020. However, this increase comes with operating costs that decrease banks' profits. Accordingly, other channels for accessing customers have emerged with lower costs for banks; however, they are still considered auxiliary providers for the branches.



Global bank branch statistics [5].

Jordan's banking industry began in 1930 with a single bank, the Arab Bank. The banking industry is experiencing continuous growth, having increased to 27 banks [5]. Like in other countries, the banks in Jordan serve critical roles in economic growth. Accordingly, the services provided by banks in Jordan, as well as the number of customers benefiting from these services, are growing rapidly. To support the role of banking in the economy, the Jordanian Banking Law was created in 2000 to increase the effectiveness of the country's banking industry. Moreover, the Association of Banks in Jordan was established to advance the banking business and develop various objectives for developing the banks and economy-related activities. These factors have caused the rapid expansion of the banking industry in Jordan over the last two decades [6, 7]. Generally, this expansion can be demonstrated using the branches measure, as illustrated in Figure 2.



2. Literature Review

Akbari et al. [8] studied the factors affecting customer acceptance of virtual banking. The study began by identifying 111 indicators from the literature. Based on the conducted survey, it was found that infrastructure, knowledge, and policies are the main factors affecting the adoption of virtual banks in Iran. Salahudin and Joo [9] studied the challenges of e-services in Malaysia using a questionnaire with a sample of 384 and a response rate of 31.25%. The study resulted in five factors challenging the utilization of e-services being identified: 1) the services' efficiency and effectiveness, which reflect customer satisfaction and the security gap; 2) data privacy and security; 3) the effect of user experience, which reflects the reliability gap. Tahtamouni [6] collected data based on a questionnaire from 170 individuals from three institutions in Jordan. The results showed that users' satisfaction with the quality of e-services is high and that the quality of the services is influenced by ease of use, time, and security. Accordingly, it was suggested that these factors positively attract customers to utilize eservices. Chaimaa et al. [10] identified the challenges from bankers' and customers' perspectives, which are listed as follows: 1) accessibility concerns due to limited internet access; 2) startup cost for the banking systems; 3) knowledge-based gap due to difficulties in using the online systems; 4) security concerns due to the security gap; 5) authentication time due to multiple authentication processes. These challenges fall under proper planning by bankers, as well as security, knowledge, and technology-related gaps. Fathima [11] presented the following strategies for pleasing consumers that adopt virtual banks in India: 1) spreading knowledge since India's target customers have low education levels, with the low knowledge levels presented being a major reason for the low adoption of virtual banks in India; 2) improving safety and developing strategies to protect against hackers; 3) employee training to adapt to new ways of processing customers' demands and inquiries; 4) improving the simplicity of banking applications; 5) advertising to spread the benefits of virtual banks and electronic channels while fostering customer motivation. These factors can be categorized as technical and technology understanding gaps. Fernando and ALF [12] studied the adoption of virtual banks in Sri Lanka. A survey was conducted with 400 virtual banking customers. Among 11 studied factors, including personal, technology, access, knowledge, information, attitudinal, and others, the ability to effectively manage finance is the most significant. Rawwash et al. [13] studied factors affecting the adoption and utilization of e-services in Jordan using internet banking. A sample of 300 participants was asked to respond to the questionnaire, which included questions about usability, convenience, usefulness, confidence, and security. Among the studied factors, convenience was found not to affect the utilization of e-services. Accordingly, the study suggested improving and enhancing the services provided to satisfy the usability, usefulness, confidentiality, and security of internet banking. Anouze and Alamro [14] surveyed a sample of 328 bank customers. Regression and an artificial neural network were used to assess the significance of factors affecting the adoption of e-services in Jordan. The results showed that ease of use, security, and price hindered the utilization of e-services. Interestingly, this study mentioned that the high internet cost might affect the adoption of e-services. However, business, education, and other activities continued during the COVID-19 pandemic through online activities. The results suggest that the survey may have been conducted before the pandemic. Tham et al. [15] analyzed customer perceptions of trusting virtual banking systems in Malaysia. Security perceptions were analyzed based on user perception due to poor knowledge of using the internet and mobile banking applications. Based on the analysis of 402 completed surveys, privacy concerns were not found to influence the adoption of virtual banking among customers. On the other hand, trust and security are Malaysian customers' main concerns that hinder virtual banks' utilization. Ahmadalinejad and Nabavi [16] presented the customer relationship management (CRM) technique as a solution to the challenges of virtual banks. According to the CRM, trust is the major concern of customers when using the online tools of virtual banks. Increasing the system's flexibility, risk management, and customer-oriented strategies should be adapted to reduce the risk and improve customers' perspectives on the risk of using online services. Khaki and Poordadashi [17] focused on security and cybercrimes as the main challenges for virtual banks. They proposed solutions to ensure the security of virtual banking systems. According to Khaki and Poordadashi [17], an interesting factor affecting the security of a system is its complexity, which can create vulnerabilities in both developing and using these systems. Faruque and Biplob [18] identified major factors that can be categorized into infrastructure, knowledge, and security problems. Regarding infrastructure, the cost of technologies, lack of technical support, internet access problems, and a lack of qualified human resources are the main variables. In terms of knowledge, low education is the main variable. Finally, for security, cybercrimes generally challenge the adoption of virtual banks in Bangladesh. Ahmadalinejad and Ghasempouri [19] studied the security gap embodied in financial crimes as a challenge of virtual banking that should be addressed. The governance, risk, and compliance system should be adapted to improve the trust between customers and banks. Governance relates to actions that ensure policies and regulations are properly implemented. Risk is linked to actions aimed at recognizing and controlling the risk of using virtual bank applications. Compliance relates to complying with the standards by which the functionality of the e-services is implemented. Kaseke and Charira [20] evaluated factors affecting the adoption of virtual banking systems in Zimbabwe. According to the survey conducted using a random sample, participants' level of education, age, and wealth are the main factors related to the utilization of electronic services. Accordingly, the results suggested that a few steps should be implemented to improve the adoption of virtual banking systems: 1) improve awareness; 2) improve infrastructure and access to new technology; 3) improve system security. An early study that investigated the failure of adopting virtual banks was presented by Dandapani and Lawrence [21]. According to that study, approximately one-third of the virtual banks established at that time failed. Both successful and failed banks were analyzed based on a set of variables. Failure was used as the dependent variable, with a set of independent variables evaluated as the failure factors. Failure factors were related to bank planning, non-interest expense, and bad asset quality. According to Perumal, the main challenges facing virtual banks are cybercrimes and phishing activities. Virtual banks should consider the following components to foster their virtual banking practices: 1) confidentiality, which concerns preventing unauthorized access to customers' information; 2) integrity, which preserves the customer's correctness; 3) availability, which ensures the availability of information for customers when requested; 4) non-repudiation, which ensures that a transaction is implemented when requested. These components, which were presented by Perumal [22] fall under the reliability and security gaps.

3. Methodology

The present research aims to analyze customer perceptions of virtual banking in Jordan, which are measured using four variables: advantages, compatibility, simplicity, and trialability. To measure customer perceptions, a survey questionnaire was used, and the questionnaire results were collected and analyzed using statistical methods. In this chapter, the research design, perception components, research model, sample, population, sampling technique, data collection, variables, instrument, and data analysis techniques are clarified.

3.1. Theoretical Model

The technology acceptance model (TAM), as illustrated in Fig. 3, is one of the most commonly used models for analyzing the characteristics of adopting innovation and technology. According to the TAM, software and system use are influenced by the behavioral intention to use. Behavioral intention is both directly and indirectly influenced by the attitude toward using, perceived usefulness (PU), and perceived ease of use (PEU). According to the TAM, user attitude can be directly influenced by PEU, which is defined as the level of a person's belief that using a specific system would be free of effort [23]. Perceived usefulness (PU) is defined as the degree to which a consumer believes that using the technology will increase performance [24]. The TAM allows researchers to directly investigate external variables, as illustrated in Fig. 3. Diffusion of innovation (DOI) theory characterizes a conceptual foundation for identifying factors that encourage the adoption of innovations: advantages, compatibility, simplicity, and trialability. The flexibility of the TAM facilitates the integration of the DOI components [25].



Figure 3.

TAM influencing factors.

Accordingly, an integrated model of the TAM and DOI is developed, as illustrated in Fig. 4, to investigate the factors affecting the adoption of virtual banks in Jordan. The external variables incorporated into the model are the four characteristics of the DOI theory with direct influence on the intention to use. These characteristics are listed in Table 1. First, the relative advantage is the degree to which the system is better than its predecessors in the banking field. Second, compatibility is the degree to which the system is consistent with the provided and demanded services in the banking system. Third, simplicity relates to the ease of use and understanding of the system. Finally, trialability is the degree of experimentation with minimal responsibility and risk. The measurements of these characteristics will show the intention to use and reflect challenges and opportunities that should be considered when promoting virtual banks in Jordan.



Research framework (adapted from the TAM & DOI).

Table 1.

Utilized characteristics as external variables.

Characteristics	Description	Filling Gap (Challenges and Opportunities)
Advantages	The advantages compared to previous banking	The technology gap relates to perceived and
	developments (branches, online, and mobile). The	provided functionalities.
	higher the perceived advantages, the more likely	The security gap relates to the perceived and
	virtual banking use would be.	provided risk-free systems.
Compatibility	The ability to use virtual banking to accomplish	The reliability gap relates to perceived and
	transactions implemented by previously developed	provided service fulfillment.
	banking systems (branches, online, and mobile).	The human interaction gap relates to the ability
	The higher the perceived compatibility, the more	to communicate with human support when
	likely virtual banking use would be.	needed.
Simplicity	The degree to which virtual banking systems are	The technology gap relates to differences in the
	easy to use—the higher the perceived simplicity, the	perceived and provided ease of use.
	more likely virtual banking use would be.	
Trialability	The ability to try the virtual banking system with	The security gap relates to the perceived and
	limited functions. The higher the perceived	provided risk-free systems.
	trialability, the more likely virtual banking use	
	would be.	

3.1. Research Design

The quantitative research was adapted for factor analysis. Quantitative research involves collecting and analyzing numerical data, as opposed to qualitative research, which involves collecting textual data using an open-ended questionnaire, interviews, and behavioral questions. Quantitative data can identify patterns, causal-and-effect relationships (experimental research), correlations, and test hypotheses [26].

Quantitative research has the following advantages: 1) replication, which is the ability to re-conduct the research to obtain similar results, which is possible due to the standardization of the data collection process; 2) comparability, which is the ability to compare the results with similar studies with different samples, settings, and conditions; 3) consistency, which is the reliability of processing a large volume of data using analysis tools and methods; 4) reporting: the ease of reporting the findings through statistics, predictions, and inferences [27].

3.2. Population and Sample

The population under consideration is bank customers in Jordan, regardless of their associated banks. No age or gender specification is enforced to identify overall perceptions of virtual banks in Jordan. This implies that the researcher sought to uncover the possibilities of the banking sector in Jordan to be developed into a virtual banking system in the near future, as well as customers' perceptions about such development. Remote areas might be a disadvantage since the residents of such areas still use banks and may have different perceptions. However, the expected influence of such barriers may affect their judgment of their situation, which is not based on the demands and perceptions of banking services. Accordingly, customers in these areas may require a different method to collect and understand their perceptions.

A convenience sampling technique was used to represent the whole population. The required sample size was determined using a statistical equation. The respondents to the questionnaire were randomly selected from a selected branch of each of

the banks listed in the Association of Banks in Jordan. The respondents are those visiting one of the selected branches of these banks during the close time intervals. Accordingly, the sampling technique gives equal opportunities for each customer visiting the branch to make transactions. To ensure the randomization of the selected samples, the selected branches are located in different areas, and the visiting time intervals are also randomized; for example, different branches are visited at different time slots on different operation days across the 23 sequential days allocated for data collection (excluding weekends).

3.3. Hypotheses

 $H_{01:}$ There is no impact of PU with its dimensions (advantages and computability) on the intention of Jordanian customers to use virtual banks.

From H₀₁, two sub-hypotheses are derived:

- H₀₁₁: There is no impact of advantages on the intention of Jordanian customers to use virtual banks.
- H₀₁₂: There is no impact of compatibility on the intention of Jordanian customers to use virtual banks.

 H_{02} : There is no impact of PEU with its dimensions (simplicity and trialability) on the intention of Jordanian customers to use virtual banks.

- H_{021} : There is no impact of simplicity on the intention of Jordanian customers to use virtual banks.
- H₀₂₂: There is no impact of trialability on the intention of Jordanian customers to use virtual banks.

4. Data Analysis and Results

This section aims to analyze the responses of the survey participants and identify their perspectives on using and adopting virtual banking in Jordan. Accordingly, the data source, data variations, statistical and inferential analysis of the data, and observations that were concluded from the results are covered in this section. As previously mentioned, the data were collected using survey questionnaires as the primary data collection instrument. The sample was obtained using a convenience sampling technique, which was formed by individuals who were easy for the researcher to contact. In the analysis process, the data were first collected, recorded, and then coded. Then, the coded data were analyzed using the Statistical Package for the Social Sciences (SPSS) software version 21.

4.1. Demographic Statistics

In total, 130 participants' responses to the questionnaire were collected from different cities and locations within Jordan. The demographic information of the participants in the questionnaire varies, which may affect perspectives toward the adoption of virtual banking.

4.1.1. Gender Statistics

As illustrated in Figure 4, the number of males in the sample is 68 (52.3% of participants), while the number of females is 62 (47.7%).





4.1.2. Age

The ages were divided into four intervals, which cover a range from 18 to 51 years and above. The recorded intervals are 18-30, 31-40, 41-50, and 51 years and above. Figure 5 presents the distribution of the participants based on age. As shown, the highest proportion of participants was in the 51 years and above age group, followed by those who were in the 41-50, 31-40, and 18-30 years age groups.



4.1.3. Education Level

Regarding the education of the participants, most participants held a master's degree (see Figure 6). A considerable percentage of the participants were Ph.D. holders, while those with a diploma and secondary school or below form the lowest proportion of participants.



Education distribution of the survey respondents.

4.2. Descriptive Statistics

The independent variables, advantages and compatibility (representing the PU), the simplicity and trialability (representing the PEU), as well as the dependent variable Intention to use (Int), were analyzed using descriptive statistics (i.e., mean and standard deviation). Descriptive statistics provide an assessment of central tendency and variation of the analyzed variables. The mean represents an average agreement because the survey was created using a Likert scale with the lowest value of 1 (indicating strong disagreement) and the highest value of 5 (indicating strong agreement). The mean value of the respondents for each question in the survey represents the average satisfaction of the customers regarding the related variable. Moreover, comparing the mean and the standard deviations of these variables provides an overview of customer perceptions of virtual banking in Jordan.

4.2.1. Descriptive Analysis of the Advantage (Independent Variable)

A descriptive analysis of the data collected for the advantage variable is provided in Table 2. The results show the statistics collected for five questions related to the underlying variable (Adv1, Adv2, Adv3, Adv4, and Adv5). The results for Adv1 are 4.65 (.644), which suggests that the use of virtual banking saves time. The results for Adv2 are 4.57 (0.752), which indicates that the use of virtual banking reduces fees and charges. Regarding the response to the statement "Virtual banking allows to access services anytime," which is represented in Adv3, the results were 4.64 (0.647). The results of Adv4 and

Adv5 were 4.62 (0.662) and 4.65 (.619), respectively. These statements suggest that the use of virtual banking enhances the efficiency of banking operations and that virtual banking is considered useful, respectively.

Descriptive Statistics						
	Mean	Std. Deviation	Ν			
Adv1	4.65	0.644	130			
Adv2	4.57	0.725	130			
Adv3	4.64	0.647	130			
Adv4	4.62	0.662	130			
Adv5	4.65	0.619	130			

Table 2. Descriptive statistics for the advantage variable.

4.2.2. Descriptive Analysis of the Compatibility (Independent Variable)

A descriptive analysis of the data collected for the compatibility variable linked to four questions (Comp1, Comp2, Comp3, and Comp4) is presented in Table 3. The results for Comp2 have the highest mean of 4.64 (0.623), which represents the highest agreement with the statement that the virtual banking platform is easy to navigate. Comp4 has the lowest mean of 4.58 (0.657), which is related to the integration of the virtual banking platform with existing financial tools and services.

Table 3.

Descriptive statistics for the compatibility variable.

Descriptive Statistics						
	Mean	Std. Deviation	Ν			
Comp1	4.62	0.663	130			
Comp2	4.64	0.623	130			
Comp3	4.59	0.690	130			
Comp4	4.58	0.657	130			

4.2.3. Descriptive Analysis of the Simplicity (Independent Variable)

A descriptive analysis of the data collected for the simplicity variable linked to six questions (Simp1, Simp2, Simp3, Simp4, Simp5, and Simp6) is provided in Table 4. The results indicate that the highest mean values are 4.65 (0.621) and 4.65 (0.539), which are linked to customer perspectives about virtual banking related to ease of navigation and user-friendliness, respectively. Meanwhile, Simp2 has the lowest mean value of 4.57 (0.693), which suggests that the process of setting up a virtual banking account is straightforward.

Table 4.

Descriptive statistics for the simplicity variable

Descriptive Statistics							
	Mean	Std. Deviation	Ν				
Simp1	4.65	0.621	130				
Simp2	4.57	0.693	130				
Simp3	4.60	0.711	130				
Simp4	4.65	0.539	130				
Simp5	4.62	0.674	130				
Simp6	4.62	0.588	130				

4.2.4. Descriptive Analysis of Trialability (Independent Variable)

A descriptive analysis of the data collected for the trialability variable linked to five questions (Trl1, Trl2, Trl3, Trl4, and Trl5) is provided in Table 5. The results show that Trl1 has the highest mean value of 4.64 (0.610), while Trl5 has the lowest mean of 4.55 (0.748). The statement of the highest mean corresponds to the ease of tracking and monitoring an account using the platform. The statement with the lowest mean corresponds to the ability to try the platform before adopting it.

Table 5.

Descriptive statistics for the trialability variable.

Descriptive S	Descriptive Statistics							
	Mean	Std. Deviation	Ν					
Trl1	4.64	0.610	130					
Trl2	4.62	0.601	130					
Trl3	4.62	0.615	130					
Trl4	4.60	0.630	130					
Trl5	4.55	0.748	130					

130

4.2.5. Descriptive Analysis of the Intention to Use Variable (Dependent Variable)

The results of the descriptive statistics for the intention to use variable are presented in Table 6. According to the results, customers are generally satisfied with virtual banking, with a mean value of 4.6354 and a standard deviation of 0.57787 based on a 5-point Likert scale. Overall, the results of all the independent and dependent variables were in the range of 4.55–4.65, which shows high agreement with the statements related to the underlying variables.

Table 6.								
Descriptive statis	Descriptive statistics for the intention to use variable.							
Descriptive	Descriptive Statistics							
	Mean	Std. Deviation	N					

4.3. Regression Analysis

The results of a regression analysis present the influence of the independent variables on the dependent variable, which is customer perceptions of the intention to use virtual banking. As shown in Table 7, the R-squared values assess the goodness of fit of the independent variables (i.e., advantages, compatibility, simplicity, trialability) and the dependent variable (i.e., intention to use).

0.57787

Table 7.		
Regression	analysis	results

Int

Model	R	R-	Adjusted	Std. Error of		Change Statistics				Durbin-
		Squared	R-	the Estimate	R-Squared	R-Squared F df1 df		df2	Sig. F	Watson
			Squared		Change	Change			Change	
1	0.935 ^a	0.874	0.873	0.20593	0.874	887.795	1	128	0.000	
2	0.974 ^b	0.948	0.947	0.13304	0.074	179.664	1	127	0.000	
3	0.980 ^c	0.960	0.959	0.11696	0.012	38.331	1	126	0.000	
4	0.985 ^d	0.970	0.969	0.10126	0.010	43.084	1	125	0.000	2.037
5	0.987 ^e	0.974	0.973	0.09565	0.003	16.116	1	124	0.000	

The regression results can be summarized as follows:

4.6354

- In the analysis of the results, as presented in Table 7, the adjusted R-squared values are very close to standard R-squared values.
- The values of the adjusted R-squared for Model #1 are equal to 0.873 (compared to 0.874 for R-squared), while Model #2 is 0.947 (compared to 0.948 for R-squared), Model #3 is 0.959 (compared to 0.960 for R-squared), Model #4 is 0.969 (compared to 0.970 for R-squared), and Model #5 is 0.973 (compared to 0.974 for R-squared).

Overall, as a result, the adjusted R-squared increased from 0.873 to 0.973, while the number of variables in the models increased. Accordingly, there is sufficient evidence to reject the null hypothesis and accept the alternative hypothesis stating that there is a significant effect of virtual banking services on customer perception.

4.4. ANOVA Test

The ANOVA test is used to statistically test the null hypothesis. The results in Table 8 show that the F-value recorded is 887.795, which indicates model significance with a significant p-value of 0.000; therefore, the ANOVA results suggest that the regression model is highly significant and provides a good fit to the data.

Model		Sum of Squares	df	Mean Square	F	Sig.	
	Regression	37.649	1	37.649	887.795	0.000b	
1	Residual	5.428	128	0.042			
	Total	43.077	129				
	Regression	40.829	2	20.415	1153.328	0.000c	
2	Residual	2.248	127	0.018			
	Total	43.077	129				
	Regression	41.354	3	13.785	1007.674	0.000d	
3	Residual	1.724	126	0.014			
	Total	43.077	129				
	Regression	41.795	4	10.449	1018.946	0.000e	
4	Residual	1.282	125	0.01			
	Total	43.077	129				
	Regression	41.943	5	8.389	916.956	0.000f	
5	Residual	1.134	124	0.009			
	Total	43.077	129				

Table 8.ANOVA analysis results

Note: a. Dependent Variable: Int b. Predictors: (Constant), Adv4

c. Predictors: (Constant), Adv4, trl4

d. Predictors: (Constant), Adv4, trl4, Adv1

e. Predictors: (Constant), Adv4, trl4, Adv1, Simp4

f. Predictors: (Constant), Adv4, trl4, Adv1, Simp4, trl3

From Model #2 to Model #5 in the analysis, the number of predictors increases gradually. This implies that additional variables are being added to the regression models to examine their effects on the dependent variable "Int."

The analysis shows that as more predictors are added, the degrees of freedom also increase with each additional predictor.

The mean squared error also decreases, indicating a better fit of the models to the data. The F-values for each model are relatively high, suggesting a significant relationship between the predictors and the dependent variable. Furthermore, the low p-values in the "Sig." column further support the significance of these relationships.

Overall, the analysis demonstrates that the inclusion of additional predictors improves the explanatory power of the regression models and strengthens the relationship between the predictors and the dependent variable "Int."

4.5 Multiple Regression Analysis

A multiple regression analysis examines the correlation between the dependent and independent variables. Accordingly, the variance inflationary factor (VIF) and tolerance assessment were utilized to measure the correlation. The fit is accepted when the VIF value does not exceed 10, while the tolerance value should exceed 0.05. Table 9 provides the information required to determine whether or not the independent variables contribute significantly to the model.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.863	0.128		6.744	0.000		
	Adv4	0.816	0.027	0.935	29.796	0.000	1.000	1.000
	(Constant)	0.435	0.089		4.910	0.000		
2	Adv4	0.469	0.031	0.538	14.982	0.000	0.319	3.136
	trl4	0.441	0.033	0.481	13.404	0.000	0.319	3.136
	(Constant)	0.354	0.079		4.477	0.000		
2	Adv4	0.420	0.029	0.481	14.617	0.000	0.294	3.404
3	trl4	0.290	0.038	0.316	7.641	0.000	0.186	5.381
	Adv1	0.217	0.035	0.242	6.191	0.000	0.209	4.795
	(Constant)	0.040	0.083		.478	0.633		
	Adv4	0.386	0.025	0.443	15.242	0.000	0.282	3.544
4	trl4	0.129	0.041	0.140	3.139	0.002	0.119	8.386
	Adv1	0.291	0.032	0.324	8.996	0.000	0.183	5.465
	Simp4	0.185	0.028	0.172	6.564	0.000	0.345	2.899
	(Constant)	0.031	0.079		.400	0.690		
	Adv4	0.298	0.033	0.341	9.146	0.000	0.153	6.555
5	trl4	0.140	0.039	0.153	3.607	0.000	0.119	8.431
	Adv1	0.275	0.031	0.307	8.929	0.000	0.180	5.557
	Simp4	0.142	0.029	0.132	4.943	0.000	0.297	3.371
	trl3	0.139	0.035	00.148	4.014	0.000	0.157	6.373

Table 9.Multiple regression analysis results

Based on the results reported in Table 9, the coefficients and statistical information for the models of several independent variables (Adv4, trl4, Adv1, Simp4, trl3, Simp6, Comp4, Adv2, trl5, Simp1, and Comp2) and a dependent variable (Int) indicates significant effects of the independent variables on the dependent variables. The results can be summarized as follows:

- Model #1: This model consists of a single independent variable (Adv4) and resulted in an unstandardized coefficient (B) of 0.816, which indicates that for every one-unit increase in Adv4, the dependent variable is expected to increase by 0.816 units. The standardized coefficient (beta) has a value of 0.935, which suggests that Adv4 has a strong positive impact on the dependent variable. The t-value is 29.796, which indicates that the coefficient is statistically significant.
- Model #2: This model includes two independent variables: "Adv4" and "trl4." Both variables have positive coefficients, which indicates a positive relationship with the dependent variable. Moreover, "Adv4" has a stronger impact with a beta of 0.538 when compared to "trl4," which has a beta of 0.481.
- Model #3: Three independent variables are included in this model: "Adv4," "trl4," and "Adv1."All three variables have positive coefficients and contribute to the prediction of the dependent variable. Among these variables, "Adv4" has the highest standardized coefficient with a beta value of 0.481, followed by "trl4" with a beta value of 0.316 and "Adv1" with a beta value of 0.242.
- Model #4: Four independent variables are included: "Adv4," "trl4," "Adv1," and "Simp4." Similar to the previous models, all variables have positive coefficients and are statistically significant. The highest beta value is associated with "Adv4" with a beta value of 0.443, followed by "trl4" with a beta value of 0.140, "Adv1" with a beta value of 0.324, and "Simp4" with a beta value of 0.172.
- Model #5: All five predictors (Adv4, trl4, Adv1, Simp4, and trl3) are statistically significant and positively associated with the dependent variable. Adv4 is the most influential predictor, followed by Adv1, while Simp4, trl4, and trl3 have smaller impacts. However, high VIF values indicate potential multicollinearity concerns.

5. Summary of Data Analysis

This document presents the analysis of data collected from a survey conducted to understand the perspectives of participants in Jordan regarding the adoption of virtual banking. The analysis covers the demographic statistics of the participants, descriptive statistics of the key variables, correlation analysis, regression analysis, and ANOVA test results.

The demographic statistics indicate that the sample consisted of 130 participants, with 52.3% males and 47.7% females. The majority of the participants were in the age group of 51 years and above, followed by the 41–50 age group. Moreover, most of the participants had a master's degree.

A descriptive statistics analysis was conducted for the independent variables (advantages, compatibility, simplicity, trialability) and the dependent variable (intention to use). The results indicate high agreement among the participants toward the statements related to these variables, with mean values ranging from 4.55 to 4.65 on a 5-point Likert scale.

Unique insights: the comprehensive analysis presented in this document provides valuable insights into the factors that influence the adoption of virtual banking in Jordan. The high level of agreement among participants regarding the advantages,

compatibility, simplicity, and trialability of virtual banking suggests that these are crucial elements driving the adoption of this technology. The regression and ANOVA analyses quantify the strength of these relationships, highlighting the importance of addressing these aspects to promote the widespread adoption of virtual banking in Jordan.

6. Conclusion

In this paper, the statistical analysis results indicate that the independent variables, which are the advantage, compatibility, simplicity, and trialability, strongly affect the adoption of virtual banking in Jordan. These independent factors are linked to the variable of the intention to use, which is the dependent factor that reflects the customer's perception of virtual banking adoption. These variables are used in a framework built to test a set of hypotheses defined in advance. Overall, the independent factors identified in the framework (i.e., advantage, compatibility, simplicity, and trialability) are found to have a significant relationship with the adoption of virtual banking in Jordan. In the future, studies should investigate the platform further from a technical perspective. Future work should focus on different aspects, including an analysis of the platforms and the status of virtual banking in Jordan.

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