

# Smartphone Banking Applications and Digital Financial Inclusion Barriers Mitigation: The Moderating Role of Behavioral Intentions (The Case of Iraq)

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## ABSTRACT

In adopting digital financial inclusion using digital apps in the Iraqi banking sector, users' behavioral intentions and acceptance of digital apps are critical considerations to mitigate financial inclusion barriers. This study **examines** and discusses the role of smartphone banking technology as a new trend for extending financial inclusion by testing the impact of clients' behavioral intentions (as a modified variable) on the part of smartphone banking apps in mitigating the digital financial inclusion barriers in the Republic of Iraq. The study used two models: the unified theory of acceptance and use of technology (UTAUT) model to determine essential constructs of technology use and a second model, a multidimensional index of financial inclusion (focusing on the dimension of the barriers). The main objective is to enhance understanding of how smartphone apps mitigate barriers to digital financial inclusion. The researchers collected survey data from 338 participants of Iraqi bank clients in the Baghdad governorate. After excluding 10 invalid responses, 328 (92%) were tested and analyzed using **SPSS** software. **Results** of the two hypotheses emphasize that the respondents believe four critical constructs of the UTAUT model (PE, EE, SI, and FC) are key to digital financial inclusion and mitigate its barriers. Besides that, the positive of bank clients' Baghdad governorate behavioral intentions to use digital apps play a vital role in improving the effectiveness of smartphone banking apps to mitigate digital financial inclusion barriers. Therefore, the study **recommends** that Iraqi banks with smartphone banking apps must develop and improve those apps to extend and diversify their operations on mobile platforms to enable more comprehensive categories of Iraqi society and motivate them to use the bank apps to purchase products and implement transactions.

**Keywords:** UTAUT model; digital financial inclusion; barriers to financial inclusion; smartphone banking apps; behavioral intentions

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## INTRODUCTION

Information and communication technologies have shown a significant potential to contribute to financial inclusion; giving birth to digital financial inclusion (DFI) [1], in general, the vast developments in smartphone technology, in particular, help the transformation of all economic sectors toward digital business, especially the banking sector. Furthermore, the progress of smartphone technology has motivated customers who rely on mobile devices to purchase banking services and products compared with face-to-face services [2] because these devices are the most widespread in the community and the easiest and most effortless to use. Mobile technology developments forced banks to update and adapt their operations and product structure with smartphone

apps. In the context of the digital financial inclusion philosophy, they provide different channels for banks to deliver services and products to all society members.

Financial inclusion philosophy has become a considerable and growing interest because it is vital for economic growth and poverty alleviation (World Bank).<sup>1</sup> Financial inclusion is described as a state in which everyone in society (particularly people with low income) can access a range of high-quality financial services and reasonable prices in conjunction with the comfort and protection of customers [3]. Financial inclusion becomes one of the significant challenges for all-global institutions,

<sup>1</sup> World Bank, Global Financial Development Report 2014: Financial Inclusion. Washington, DC, 2014. DOI: 10.1596/978-0-8213-9985-9

decision-makers, central banks, financial and banking institutions, and governments because it impacts business sustainability in companies because they help promote and market products and thus increase market share [4]. Therefore, one of the strategies to mitigate financial inclusion barriers is making policies that support the extension of the digital financial and banking sector to include unbanked people from individual or country levels because government support positively correlates with digital technology adoption [5, 6].

Based on the aforementioned, smartphone banking apps are considered one of the most exciting channels for supporting digital financial inclusion and mitigating inclusion barriers because they will provide society with a better way to access and use financial and banking activities, whether from the formal or informal financial system. It imposes the banks to design and provide suitable infrastructure to all community segments to satisfy their needs for products and services efficiently and at affordable costs.

However, more than smartphone apps are required to support digital financial inclusion because clients' behavioural intentions to use these apps must be considered considerably. These intentions are affected by the four critical constructs of technology acceptance (performance expectancy, effort expectancy, social influence, and facility conditions) [7, 8]. These intentions motivate the positive behaviour of clients to contribute to mitigating financial inclusion barriers and disseminating the digital financial inclusion culture [9, 10].

In the Iraqi Republic, smartphone apps are a new Fintech concept and emerging trends toward financial inclusion. However, they need help with operating conditions, community culture, banking habits, and available efficient facilities. The decision-makers of the Iraqi central bank put forward a national strategy (2020–2023) to enhance financial inclusion and digitalism in the payment system (Central Bank of Iraq).<sup>2</sup> Besides that, they direct the financial and banking sector to provide its activities and products to all segments of Iraqi society by using all new Fintech ways and devices, including mobile banking apps. However, 66.5% of the Iraqi community is still unbanked (Iraqi Private Banks League),<sup>3</sup> and faces

many barriers to accessing banking facilities and services because of poverty or financial problems. Moreover, the financially excluded society suffers from a lack of financial literacy and a weak banking habit.

The current study problem focuses on how Iraqi banks adapt their digital activities and products to smartphone apps that are affordable, flexible, and easy to access that suit all segments of Iraqi society, wherein the Iraqi banking sector faces complex challenges regarding the weak network internet, telecom quality drops, and high costs. Besides that, the Iraqi community suffers from economic volatility and problems, weak law rule, a gap in income inequality, inadequate social awareness, and regulatory constraints that led to increasing and extended financial inclusion barriers in the Iraqi banking sector. Thus, based on these problems, the study attempts to answer the below two questions and examine the factors of using smartphone apps that contribute to mitigating the digital financial inclusion barriers in Iraq.

Are critical constructs of the smartphone banking technology helping the Iraqi banking sector to contribute to the spreading of digital financial inclusion? Are the behavioural intentions of clients moderate the combined effect of key constructs of smartphone app acceptance on mitigating digital financial inclusion barriers in Iraq?

## THEORETICAL FRAMEWORK

### E-banking Mobile: Concept and Advantages

The mobile technology development and its apps have accelerated transforming the financial and banking environment toward digitalism and changed the banking industry model from traditional operations to digital transactions. As a result, smartphone banking technology has become one of the main active channels of bank digitalism, contributing to delivering products and banking services and conducting banking transactions regardless of time and place [11], including balance checking, money transfer, check deposit, stock trading, and other financial or non-financial banking services [12, 13].

Smartphone banking apps provide multiple advantages for clients and banks. Clients help accessibility to banking services with high flexibility and proliferation and create interaction and comprehensive coverage for banks [14], helping them reduce their front-end and back-end costs [15]. Banks do not need physical branches, fewer employees, and a lower total cost. In addition, conducting

<sup>2</sup> Central Bank of Iraq, the second Strategic Plan 2021–2023. URL: <https://n9.cl/t6j3f5> (accessed on 18.01.2023).

<sup>3</sup> Iraqi Private Banks League, 2022. URL: <https://www.ina.iq/165270-335.html> (accessed on 18.01.2023).

a comparison and analysis, automatically extracting results, and sending them to the clients if requested is much easier than doing it manually. Therefore, although in the short term, they spend more on electronic devices, networks, and software, in the long term, they can maximize the return and deliver various products to all clients to achieve financial inclusion [16]. The new option to sustain client relationships is the shift toward digitalism to implement financial activities and deliver banking products through information technology applications and communications [17]. It contributes to sustaining financial services and makes it a wideness because the smartphone is the most widespread tool among members of society and the easiest to use compared with other digital devices. It is preferred to get services for face-to-face banking.

### Financial Inclusion (FI) Philosophy Framework

Financial inclusion means how financial services are characterized by ease, reduced costs, and availability to all companies and individuals, regardless of their net wealth and business size [18], to ensure that low-income groups have access to appropriate, timely, and affordable financial and credit services [19]. The concept of financial inclusion goes beyond single indicators, such as the percentage of bank accounts and loans or the number of automated teller machines (ATMs) and bank branches [20].

According to the perspective of exclusion, the financial inclusion target group is considered financially excluded if it cannot reach official necessary financial services such as bank accounts, insurance, credit facilities, and payment facilities [21], i.e., those that do not have access to the financial and banking institution. Beck [22] explains the unbanked population of individuals or businesses as those that do not have access to the financial institution. Unbanked individuals are often associated with the lower-income population segment, whereas unbanked businesses do not get credit and other banking services to sustain funding their projects [23]. Financial inclusion is described as a state in which everyone can access a range of high-quality financial services and reasonable prices in conjunction with the comfort and protection of customers [24]. Based on those mentioned above, financial inclusion is a humanistic and socialistic activity that strives to access all community segments to provide comprehensive financial services, achieve financial stability and economic

growth, enhance competition, and provide protection [15, 25–27]. It can be a tool for promoting and executing the principles of sustainable development [28]. The financial inclusion philosophy is multidimensional and constantly evolving by providing financial services designed to meet the needs of all segments of society to achieve multiple goals regarding economic and social well-being [29]. Besides that, it is essential for ending poverty, enhancing competition between financial banking institutions, and diversifying the services offered at low cost and high quality [30]. However, this philosophy varies in different countries and geographical regions, depending on the level of social development, economic, financial technology level, and market share in the banking sector. Therefore, core and headline indicators place a given population along a continuum of access, various financial services, and functional perspective depending on its usage of formal, semi-formal, and informal financial services and those excluded from the use of financial services [31].

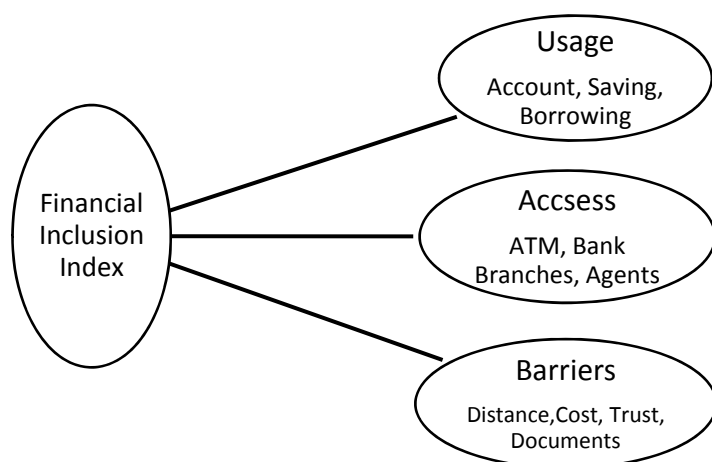
### Multidimensional Index of Financial Inclusion

The growing interest in financial inclusion measurement has given birth to many indexes to determine the degree of financial inclusion collected and formulated as a model called the multidimensional financial inclusion index, as follows in *Fig. 1* [20] (GPFI).<sup>4</sup>

Based on *Fig. 1*, the usage dimension is correlated to creating banking accounts by people, holding at least one of the financial and banking services, and enabling them to execute banking transactions by smartphone apps (for example, e-payments, e-purchases, e-transfer money, deposits, and credit accounts). In comparison, the access dimension is measured by the number of bank branches for every 10 000 adults at each governorate, ATMs, and agents for 1000 km<sup>2</sup>. In this context, smartphone technology will encourage voluntary or self-exclusion and involuntary exclusion to connect with banks because smartphone banking apps will help to mitigate the distance between banks, branches or selling points, and clients.

Furthermore, if financial inclusion is considered a behavioural issue, clients must decide whether or not to use smartphone apps to access banking services. Mostly, self-exclusion is of cultural reasons, lack of income, or

<sup>4</sup> GPFI, G20 Basic set of Financial Inclusion Indicators, 2016. URL: <https://2u.pw/BtdxWO> (accessed on 18.01.2023).



**Fig. 1. Multidimensional Financial Inclusion Index**

Source: Authors compilations.

lack of awareness of the benefits of available products and services that do not satisfy their needs and wants. Trust in the banking system may not exist owing to a lack of essential information regarding the banking sector that imposes clients to pay a high cost to get products or services.

Financial technology (Fintech) can reduce financially excluded persons and increase financial inclusion among community members [32, 33] by bridging unbanked people to financial services, reducing transaction costs, and unbundling services to provide products that fit customers' needs [34]. Mobile technology and its apps are changing the banking services structure and birthing a new financial inclusion model built on the fast, low-cost, mobile delivery of digital financial and banking services. Therefore, digitalization is considered the active involvement of new digital and trending technologies in the business context to increase revenue and opportunities for ongoing projects [35].

#### **Smartphone Banking Apps and Digital Financial Inclusion Barriers Mitigation**

The main obstacles to reaching financial inclusion are the absence of geographical access, the high costs of using products and services, the need for appropriate financial products, and financial illiteracy [36]. Nevertheless, digital technology and financial innovation have strong channels for a new financial inclusion model. Therefore, integrating digital apps and financial and banking services is vital in resolving financial exclusion and mitigating its barriers. Smartphone technology has revolutionized the banking

delivery chain [15]. It bridges clients and banking service providers to achieve wider interconnections between people and the place that underlines financial exclusion.

Therefore, these apps will enable the banks to deliver their services and products to all community segments securely, enhance client trust safely, and reduce front-end costs significantly to mitigate cost barriers. When everyone has a smartphone and banking operations and products are digital, every phone will become a digital bank, every person will be accessible at a low cost, every financial service will be just a digital app, and every person will have access to the financial system and gain services or products with high performance and few efforts. Besides that, clients can get technician facilities from the bank or/and their friends or families to executive banking transactions (social influence and facility conditions).

The process of digital financial inclusion begins with the assumption that the excluded and underserved population has some formal bank account and needs digital access to enable them to carry out basic financial transactions remotely [37]. In this sense, the contribution of smartphone banking technology to financial inclusion has given birth to what has been called DFI, an extension of financial inclusion where all financial operations are performed in a cashless mode [38]. Thus, DFI defines digital access to formal financial services as a sector of vulnerable populations that traditionally remained excluded [1]. DFI is the implementation and execution of FI; it is faster, more efficient, and cheaper and enables the sustainability of financial products provided to customers



at an affordable cost [39]. Digital financial inclusion involves providing access to affordable formal financial services to the excluded population using existing digital technologies [40].

Based on those mentioned above, the theoretical underpinnings for the positive effect of smartphone banking apps on mitigating the barriers of digital financial inclusion are based on the fact that a large amount of the excluded population owns a mobile phone and that the provision of financial services via mobile phones can improve access to the financial excluded members of the community, considering the behavioral intentions of individuals to use this technology.

### **Smartphone-Banking Technology Acceptance and Clients' Behavioral Intentions (CBI)**

Fishbein and Ajzen's Theory of Reasoned Action (1975) confirmed that the individual's behavioral intention is determined by the individual's attitude toward the behavior and the normative pressures that the individuals experience [41]. The normative force or the subjective norm directly affects the individual's behavioral intention [42, 43] because others may influence individuals to use technology. Therefore, the clients' behavioral intention to use smartphone-banking apps is subject to their attitude toward usage, which would be conditioned by critical constructs. UTAUT summarized the constructs of technology acceptance after reviewing eight popular theories that are related to information systems (TRA, TAM, MM, TPB, MPCU, IDT, SCT, and TAM-TPB) [44–46].

1. Performance expectancy (PE): Davis [47] argues that a system's overall perceived usefulness can be explained as the degree to which people believe that new technology utilization will improve the overall performance of a specific task. In this context, the study adapts the concept of PE based on [48], which is defined as the degree to which people maintain that smartphone app utilization will enhance daily activities and job performance with efficiency and effectiveness and then will contribute to mitigating the barriers of financial inclusion.

2. Effort expectancy (EE): Venkatesh et al. [49] define EE as "the degree of ease associated with the use of the system". Individuals who hold this belief will have positive attitudes toward m-banking utilization because services on mobile devices can be viewed as complicated and tedious owing to the various physical constraints

associated with digital banking, such as difficulties inputting information or the small screen display [45].

3. Social influence (SI): SI refers to "the extent to which an individual perceives those important others believe he or she should use the new system" [49]; it is described as an individual's belief concerning whether other people maintain that an individual should become involved in the activity [50]. Therefore, SI is believed to impact consumers' intention significantly to utilize m-commerce, as highlighted by [51]. In the context of this study, Iraqi banks must consider smartphone-banking apps as a part of their financial inclusion plans to avoid the client dimension distance barriers between banks and society members, enhance trust and healthy documentation, and deliver affordable products and services.

4. Facilitating conditions (FC) consider the extent to which an individual believes that a technical and organizational framework is present to support system utilization [49]. Several technology scholars [52, 53] found that the facilitating conditions positively affect actual use. Therefore, simplifying the smartphone-banking apps will motivate banks to make those apps a part of their financial inclusion concept, which helps to mitigate the barriers to accessing the society members of services and bank products.

### **PREVIOUS STUDIES**

M-banking technologies are gaining the interest of researchers, especially in developing countries; most studies focus on individuals' behavioral intentions to use information technology and the adoption of the attitude toward the sustainability of its use [7, 54]. Riffai et al. [55] found that performance expectancy, effort expectancy, entertainment factor, and website design profile are significant indicators that affect Omani consumer behavioral intentions. Martins, Oliveira, and Popović [56] concluded that banks' customers focus on three constructs to using technology: performance expectancy, effort expectancy, and social influence. Bruhn and Love [57] explain that public access to the formal financial sector positively correlates to creation, economic growth, and poverty reduction. Bongomin et al. [58] stated that social capital significantly mediates the relationship between financial intermediation and financial inclusion. Bongomin and Munene [59] showed that cultural norms have an essential and positive mediating role in the

relationship between the adoption and use of mobile money and financial inclusion in micro and small enterprises in developing countries. Morgan and Trinh [60], and Jünger and Mietzner [61] agreed that financial literacy is positively associated with Fintech adoption. Singh et al. [62] explained that PU has a significant relationship with technology adoption, including Fintech. Anouze and Alamro [9] stated that several major factors, including perceived ease of use, perceived usefulness, security and reasonable price, stand out as the barriers to intention to use e-banking services in Jordan.

Bongomin et al. [63] concluded that the adoption of the doctrine of hedonism leads to the improvement and use of money via mobile phones, which in turn affects financial inclusion. Vyas and Jain [64] found a complete mediation of the technology acceptance model on the relationship between the digital economy and financial inclusion. Which [10] stated that perceived usefulness and social influence are the most influential factors in the behavior intention of young customers toward adopting mobile banking services in Vietnam with the TAM model? Ahmad et al. [65] examined digital financial inclusion concerning economic growth. Baker [66] and Ji et al. [67] conclude that inclusive digital finance can significantly converge the urban-rural income gap. Wang and Fu [68] found the effect of DFI on poverty reduction. Ahmed and Al-Nuaimi [69] analyzed indicators of financial depth and financial inclusion in the Arab banking sector (Qatar and Saudi Arabia). They stated that financial depth in both countries plays a significant positive role in achieving financial inclusion. Nathan et al., [23] concluded that government support and the financial industry's initiatives would lead to greater financial inclusion of low-income communities and potentially lead to poverty alleviation among these communities. Karunakaran and Gopinathan [35] concluded that the awareness of banking-related applications is increasing and that these applications are accessible on smartphones. Based on previous studies, hypotheses were developing as follows:

H<sub>1</sub>: There is a positive combined effect of the key constructs of smartphone-banking app acceptance in digital financial inclusion barriers mitigation.

H<sub>2</sub>: There is a moderating effect of the client's behavioral intentions on the combined effect of the key constructs of smartphone-banking app acceptance in digital financial inclusion barriers mitigation.

### Study Contributions

Financial inclusion can be considered a local challenge. However, this issue is more complex in Iraq because of the high rate of financial exclusion and the low-income level of most Iraqi society members, in addition to the volatile economic situation and specific cultural perceptions about mobile banking technology. This study contributes to the richness of the literature on adopting smartphone-banking technology by providing a more comprehensive view of the importance of smartphone banking apps and explaining their role in mitigating financial inclusion barriers. Furthermore, the study delivered a new trend of digital inclusion by exploring the moderating effect of Iraqi clients' behavioral intentions on the combined effect of four key constructs of the UTAUT model to mitigate the digital financial inclusion barriers. Besides that, the study shows the banking policymakers' view that increasing financial inclusion must be based on mitigating the inclusion barriers and adopting new smartphone technology trends to extend digital financial inclusion.

## RESEARCH DESIGN

### Study Model

Figure 2 displays the constructs of the study model. The model includes the independent variables that represent the acceptance factors of smartphone apps, which are selected based on the four primary constructs of the UTAUT presented by Venkatesh et al. [44]. The dependent variable includes the components of the financial inclusion barriers, which determine them according to the multidimensional financial inclusion index [20].

### Study Population and Sample

The study population includes all clients of local Iraqi banks in the Baghdad governorate. Given that determining the study population precisely is challenging, the study sample size was determined based on the rule of 100 individuals [70]. The researchers distributed 356 questionnaires using a simple random sampling method; 338 responses were redeemed. After excluding 10 invalid responses, 328 responses were subjected to testing and analysis, which represented 92% of the study sample.

### Measurements

The questionnaire uses a five-point Likert scale to measure the Smartphone-banking apps and

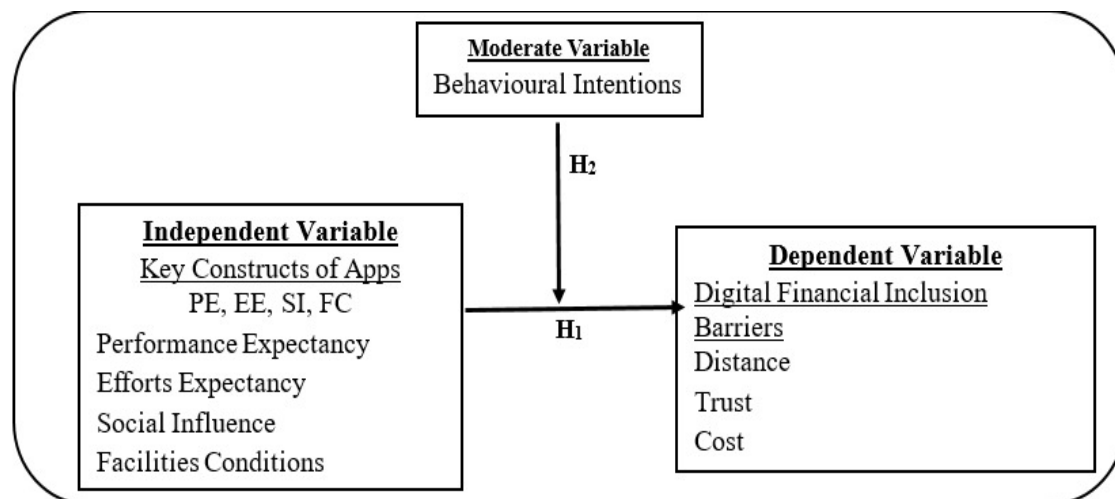


Fig. 2. The Research Model

Source: Authors compilations.

digital financial inclusion variables (study model constructs). The questionnaire was formulated based on the UTAUT theory by Venkatesh et al. [49] and the multidimensional financial inclusion index [20]. The questionnaire included three sections. The first is regarding the respondent's demographic characteristics, and the second includes questions to measure the independent variables (performance expectancy, effort expectancy, and social influence and facility conditions). The third focused on measuring digital financial inclusion barriers (distance, trust, cost, and documents). Table 1 displays the demographics of participants.

#### Validity and Reliability

The questionnaire was subjected to 10 academic referees in management information systems and finance and banking experts to verify scientific integrity and the extent to which the questions belong to a questionnaire and then modified based on the referees' observations to ensure consistency with the study goals. Moreover, the researchers conducted the Cronbach alpha test to examine the internal consistency coefficient of the questionnaire components, wherein its value is acceptable whenever it exceeds (0.70 up to 1) to check that the internal consistency is high [71, 72].

Table 2 signed that the Cronbach alpha value (0.884–0.725) is acceptable and confirms that the questionnaire is valid to test. Moreover, the values of the arithmetic mean, standard deviation, and the relative importance of the study variables show that the participants believed the critical constructs of smartphone banking apps

have positive features that will motivate the behavioral intentions of members of Iraqi society to use these apps to access banking services and products. Therefore, banking digitalized becomes one of the key tools to achieving financial inclusion goals and mitigate its barriers to spreading digital inclusion.

## DATA ANALYSIS AND HYPOTHESES TESTING

### Person Correlation

Table 3 shows Pearson's correlation coefficient matrix between the independent variables inside and the dependent variable on the other side. It shows that all variable's coefficients are positive and statistically significant at the 1% level. Furthermore, their values did not exceed the permissible percentage (80%) according to the assumptions adopted in the field of statistics. This result confirms the validity of the absence of the multiple linear correlation between the independent variables.

### Tolerance and Variance Inflation Factor

Table 4 indicates that a tolerance value is more than 0.2 and no multicollinearity problem is found between the independent study variables. Moreover, all VIF values are under five and within the permissible limits.

## HYPOTHESES TESTING

### First hypotheses Testing Result:

Table 5 shows the results of testing the study's first hypothesis before sharing the modified variable (behavioral intention of the clients) to verify the

Table 1

## Demographic Characteristics

Variable	Category	Frequency	Percentage (%)
Gender	Male	145	44.2
	Female	183	55.8
	Total	328	100%
Age	20–30	89	27.1
	31–40	114	34.8
	41–50	76	23.2
	Over 50 years old	49	14.9
	Total	328	100%
Qualifications	Diploma	12	3.7
	Bachelor	187	57
	Postgraduate	129	39.3
	Total	328	100%
Account	Yes	277	84.5
	No	51	15.5
	Total	328	100%
Smartphone	Constantly	119	36.3
	Sometimes	92	28
	Rarely	70	21.3
	Never	47	14.3
	Total	328	100%

Source: Compiled by the authors.

combined effect of key constructs of smartphone-banking apps to mitigate the financial inclusion barriers.

Table 5 indicates that the beta coefficient of all independent variables is positive and significant based on t-calculated, and the combined effect of the four key constructs is statistically significant at 0.05 based on F calculated and has an explanatory power of  $R^2$  29.5% in mitigating the barriers of digital financial inclusion. Therefore, the first study hypothesis is accepted based. A positive combined effect of the key constructs of smartphone-banking application acceptance in mitigating the barriers to digital financial inclusion was observed.

### Second Hypotheses Testing Result

Table 6 refers to testing the second hypothesis after introducing the modified variable, which is the

behavioral intentions of Iraqi clients toward using smartphone-banking applications to access services and products. Table 6 shows that the modified variable contributes to increasing the explanatory power of the first model from  $R^2$  29.5% to  $R^2$  35.1%.

This result led to the interpretation that the behavioral intentions modify the combined effect of critical constructs of the smartphone banking applications acceptance toward digital financial inclusion barriers mitigation by 5.6% from the first model, as shown in Table 5.

In addition, the combined effect of key constructs of smartphone banking application acceptance is statistically significant. Accordingly, the second hypothesis is accepted to confirm that the second model is better than the first.



Table 2

## Mean, S.D and, Reliability

Cronbach's Alpha	Level	S.D	Mean	Questions	Variable	
0.884	High	0.847	3.93	PE1	Performance Expectancy (PE)	Independent Variable: Factor Acceptance of Smartphone Apps (Behavioural Intention)
	High	0.899	4.05	PE2		
	High	0.858	3.92	PE3		
	High	0.900	3.95	PE4		
	High	0.945	3.91	PE5		
	Moderate	0.975	3.63	PE6		
0.870	High	0.773	3.91	EE1	Efforts Expectancy (EE)	
	Moderate	0.986	3.52	EE2		
	High	0.873	4.01	EE3		
	Moderate	0.922	3.61	EE4		
	Moderate	0.937	3.55	EE5		
	High	0.928	3.88	EE6		
0.808	High	0.773	3.91	SI1	Social Influence (SI)	
	Moderate	0.986	3.52	SI2		
	High	0.873	4.01	SI3		
	Moderate	0.922	3.61	SI4		
	Moderate	0.937	3.55	SI5		
	High	0.928	3.88	SI6		
0.837	High	0.915	4.02	FC1	Facilities Conditions (FC)	
	Moderate	0.978	3.63	FC2		
	Moderate	0.976	3.64	FC3		
	Moderate	0.924	3.59	FC4		
	High	0.914	3.84	FC5		
	High	0.945	3.76	FC6		
0.725	High	0.955	3.82	BI1	Behavioural Intention (BI)	Moderate Variable
	High	0.957	3.77	BI2		
	High	0.855	3.98	BI3		
	High	0.998	3.71	BI4		
	High	0.728	4.09	BI5		
	High	0.986	3.71	BI6		
0.772	High	0.797	3.90	FIB1	Digital Financial Inclusion Barriers (DFIB)	Dependent Variable
	High	0.816	4.04	FIB2		
	High	0.826	3.85	FIB3		
	High	0.904	3.75	FIB4		
	High	0.885	3.88	FIB5		
	High	0.973	3.75	FIB6		

Source: Compiled by the author.

Note: Means description (1–2.33 low, 2.34–3.67 Moderate, 3.68–5 high), Sources: SPSS Output.

Table 3

## Person Correlation Matrix

Variable	PE	EE	SI	FC	DFIB	BI
PE	1	0.670**	0.654**	0.627**	0.547**	0.105
EE	0.670**	1	0.623**	0.639**	0.617**	0.023
SI	0.654**	0.623**	1	0.766**	0.538**	0.039
FC	0.627**	0.639**	0.766**	1	0.617**	0.044
DFIB	0.547**	0.617**	0.538**	0.617**	1	0.070
BI	0.105	0.023	0.039	0.044	0.070	1

Source: Compiled by the author (SPSS Output).

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

Table 4

## Tolerance and VIF

Variable		Tolerance	VIF
Independent Variable	Performance Expectancy (PE)	0.396	2.523
	Efforts Expectancy (EE)	0.377	2.652
	Social Influence (SI)	0.328	3.048
	Facilities Conditions (FC)	0.319	3.130
Moderate Variable	Behavioural Intention (BI)	0.699	1.46

Source: Compiled by the authors.

## RESULTS AND DISCUSSION

Implementing M-Banking is not feasible unless customers widely adopt smartphone banking application technologies as natural alternatives for human encounters [73]. The literature and previous studies referred to banking institutions adopting mobile banking apps owing to their role in the spread of digital financial inclusion. Thus, this study discussed and examined the new trends in financial inclusion and factors influencing smartphone banking acceptance as an innovative solution for increasing digital financial inclusion and mitigating barriers in the Republic of Iraq.

The Iraqi banking sector strengthens efforts toward spreading digital financial inclusion despite many institutional and environmental barriers. The result of the hypotheses of this study confirmed that the four constructs (PE, EE, SI, and FC) are drivers of smartphone banking app acceptance in the Iraqi

banking sector because they help to do banking transactions successfully, stream information about transactions, and make it easy to manage accounts with high performance and a little effort. Besides that, the technical facilities may motivate the Iraqi client's behavioral intentions to adopt these apps to access the informal and formal financial system. Therefore, the key constructs of smartphone technology acceptance represent innovative solutions to mitigating the digital financial inclusion barriers for downsizing the financial exclusion of some community segments.

In contextualizing smartphone banking apps in Iraq, the growth of the use of mobile banking apps is primarily supported by the IT adoption theories/perspectives, such as the technology acceptance models in general and the UTAUT model in particular, which validate and support the assertion that clients adopt technology because of performance expectancy, effort expectancy, social influence, and facility conditions.

Table 5

**First Hypotheses Testing Result**

First Model: Before the Moderating Effect				
Dependent Variable: Digital Financial Inclusion Barriers (DFIB)				
Independent Variables	(PE)	(EE)	(SI)	(FC)
B	0.165	0.361	0.041	0.160
Std. Error	0.076	0.085	0.016	0.078
Beta	0.145	0.289	0.120	0.135
T. Calculated	2.165	4.245	2.484	2.053
Sig	0.031	0.000	0.014	0.041
R	R 2	Durbin-Watson	F. Calculated	Sig
0.543	0.295	2.049	33.795	0.000

Source: Compiled by the authors.

Table 6

**Second Hypotheses Testing Result**

Second Model: After the Effect of the Moderating Variable (Behavioral Intention)					Moderating Variable
Dependent Variable: Digital Financial Inclusion Barriers (DFIB)					
Independent Variables	(PE)	(EE)	(SI)	(FC)	BI
B	0.195	0.354	−0.083	0.227	0.025
Std. Error	0.073	0.082	0.028	0.076	0.005
Beta	0.172	0.283	−0.245	0.192	0.426
T. Calculated	2.656	4.320	−2.931	2.994	5.248
Sig	0.008	0.000	0.004	0.003	0.000
R	R 2	F. Calculated	Durbin-Watson	Sig	
0.592	0.351	34.767	2.051	0.000	
0.049	0.056	Change			

Source: Compiled by the authors.

### CONCLUSION AND RECOMMENDATION

a) Smartphone banking technology may act as a tool to overcome financial inclusion barriers and provide a platform to help clients directly access financial services and products with easy steps and affordable costs.

b) A second model is better and has stronger explanatory power than the first to mitigate the barriers to digital financial inclusion. The positive client's behavioral intentions improve the combined effect of the key constructs' technology acceptance.

c) Client's behavioral intentions play a vital role in disseminating digital banking culture in Iraqi to access services and purchase products. In addition, these intentions will contribute to the increased use of digital bank apps and motivate the extension of digital financial inclusion.

d) Digital financial inclusion would make society members aware of banking services and products and adopt tangible procedures to mitigate the current and expected barriers to enhancing inclusive growth policies.

e) The study recommends that Iraqi banks adopt and promote smartphone apps to mitigate the financial exclusion of Iraqi society members and enable them

to access the financial and banking systems because it represents an innovative solution to extend the inclusion ratio.

f) The study recommends that Iraqi banks with smartphone banking apps must develop

to extend and diversify their operations on mobile platforms to enable more comprehensive categories of Iraqi society and motivate them to use the bank apps to purchase products and process transactions.

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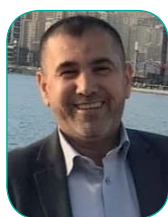


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**J.S. Al-Sarraj** — articulation of the problem, formulation of the article design, formation of the research findings.

**A.F. Altameemi** — tabular and graphical presentation and critical literature analysis.

**Z.A.F. Al-Slehat** — the statistical data collection and performance of correlation-regression analysis.

**S.D. Aloshaibat** — presentation of correlation-regression analysis using graphical methods.

**S.R. Almanaseer** — employs tabular and graphical methods to show and describe the results.

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