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The Role of Electronic Payment Methods in Enhancing Financial Inclusion

Abstract

Iraq faces numerous challenges in implementing electronic payment methods due to its slow development of non-financial institutions; increased poverty rate, low rate of awareness about formal banking system, weak technical infrastructure, lack of economic stability and political instability. This study aims at determining the challenges encountered during the widespread implementation of electronic payment systems to achieve universal financial inclusion in Iraq and provide solutions to achieve the desirable outcomes. This cross-sectional quantitative study collected 958 responses from employees of different sectors who resided in Karbala Governorate, Iraq. The collected data was analyzed using PLS-SEM, and Cronbach's alpha values were determined. The results confirmed the presence of a significant, positive relationship between the variables considered in the study. These results emphasized the role of electronic payments in expanding financial inclusion throughout the developing regions. Electronic payment methods have a positive and significant relationship with financial inclusion, and thus can help customers adopt formal banking systems, as well as earn their trust and confidence from transparency and security in financial transactions. It is the responsibility of the government to instill trust and confidentiality about the formal banking system to achieve financial inclusion and economic growth in the coming years.

Keywords

electronic payment methods | financial inclusion | banking institutions | digital payment | banking service quality

JEL Codes

G21, O16, O33

1. Introduction

Electronic payment methods transfer funds from one account to another using digital platforms or channels such as bank transfers, mobile money, and payment instruments such as credit, debit, and prepaid cards (Tamimi, 2024). Electronic payment ensures financial inclusion of all members of society, while the digitization of the banking industry has surpassed the pre-COVID-19 era. Some electronic payment intermediaries include payment facilitators, bill aggregators, and payment gateways. These players in the financial market process payments across a wider

range of channels than ever before, including mobile phones and e-commerce websites (Niankara & Traoret, 2023).

Financial inclusion remains a crucial concept in modern-day banking since it drives sustainable societal development and economic growth, while ensuring prevalent delivery of financial services to all the groups of the society, especially those with limited sources of income (Kadhee, 2020). According to (Cicchello et al., 2021), economic growth leads to financial inclusion, which also has contributions from two factors such as unemployment and literacy rate. A lower financial inclusion rate slows development.

Electronic payment methods can play an important role in enhancing financial inclusion by providing a gateway for a large class of individuals to gain access to formal banking system and, accordingly, be included in the nation's development. This seems to be an especially crucial factor in the aftermath of COVID-19 (Abbas, Abdulhassan & Abbas, 2018; Tut, 2023). Additionally, the adoption of electronic payment methods positively impacts the flexibility and growth of SMEs (Phatak, 2023). Thus, expanding financial inclusion promotes inclusive growth and economic development gains, which in turn can promote the country's growth in all aspects (Hussain et al., 2024).

It is important, however, to address any obstacles to the adoption of electronic payment methods so as to achieve financial inclusion (Khudair & Nima Al-Zubaidi, 2021). Electronic payment methods and other financially inclusive systems benefit low-income individuals, and enhance economic mobility and resilience even for those who cannot directly access them (i.e., cash-reliant customers without a conventional bank account). Electronic payment systems (EPS) also help the banking system build cash reserves, and this greater liquidity means more cash can be invested in other areas that drive economic growth (Al-Khazraji, 2020).

The public adoption of EPS is influenced by socio-economic factors as well. Ghosh & Hom Chaudhury (2022) found that gender, education and income class play a key role in influencing users' the adoption of digital financial services. Dzogbenuku et al. (2022) observed that the pattern of utilizing digital payment methods varies significantly between men and women, among different age groups, and among various income ranges and levels of technology readiness. EPS are more highly preferred among individuals with tertiary education than those with only primary or secondary education. Andaregie et al. (2024) found that age, education, income quantile, wages and level of engagement in conventional banking and financial transactions all play a significant role in the adoption of EPS. Agrawal et al. (2025) found that women exhibited a lower rate of FinTech adoption in rural India compared to rural men, and attributed this to disparities in knowledge and literacy, as well as internet access issues.

The Central Bank of Iraq began major banking reforms in the year 2003. The infrastructure for the electronic payment system was initiated in 2006, with a key focus on phasing out the manual processing of the transactions so as to increase the efficiency of

the banking system to bring it alignment with the international banking providers; prevent financial frauds; avoid privacy and security breaches; and provide quick and high-quality service to customers (AL-mamoorey & Al-Rubaye, 2020). As per the National Financial Inclusion Strategy (2025-2029), various measures have been planned by the Central Bank of Iraq to enhance financial access in the country through coordinated efforts among the industry's various stakeholders. This policy also intends to address various financial-inclusion issues, such as low account ownership and usage, access challenges, limited financial literacy, and barriers to MSME finance. This cohesive policy also seeks to combat the social and economic barriers that hinder the participation of women. Three broad-level enablers — robust financial infrastructure, supporting legal and regulatory frameworks and private sector commitment to the NFIS strategy — have been identified as part of the strategy (Central Bank of Iraq, 2024).

Digital payments can also promote digital inclusion, ensuring more people's ability to participate in the digital economy (Saidmurodova, 2025). The author further expressed that digital financial services cannot be confined to being a mere technological tool, but are rather a greater visionary instrument that can strategically enhance people's lives socially and economically, thus promoting economic equity and social inclusion. Electronic payment systems in Iraq are a key driver of economic growth; in particular, mobile payments are a viable and revolutionary concept, thanks to the high penetration of mobile phones. Mobile payment platforms such as Zain Cash and AsiaHawala have previously been introduced in the country, but their widespread adoption has been hindered by the lack of legal and regulatory frameworks for EPS management; low financial literacy; lack of technical infrastructure; a preference for cash; and concerns about privacy and legal compliance (FasterCapital, 2024). There is an established link between electronic payment and other variables such as economic growth, financial inclusion and household consumption habits. Among these, financial inclusion has been found to be a crucial factor in the adoption of electronic payment (Oyelami, Adebisi & Adekunle, 2020).

It is the responsibility of the Central Bank of Iraq, as the key decision-maker, to develop the required technical infrastructure for the banking system for its continued evolution. The regulation most recently

approved by the Iraqi cabinet — on 29th April 2024 — replaces existing regulation implemented in 2014 with an array of changes, such as a new definition for EPS comprising different types of legally-permitted financial transactions; compliance and licensing organizations providing EPS; and an assurance that financial transaction data will remain available for a period of five years (Tamimi, 2024).

AL.Musawy and Kashmoush (2022) detail the challenges faced in electronic payment methods and financial inclusion in Iraq as follows. Digitization is lagging behind in comparison with rest of the world due to a lack of financial and legal regulations for Iraq's microfinance. Slow development of non-financial institutions, increased poverty rate, lack of awareness about formal banking system, weak technical infrastructure, lack of economic stability, and political instability have added fuel to the fire.

In spite of the importance of EPS, there is a dearth of studies to confirm their effectiveness and their potential to bring all the members of Iraqi society under formal banking system — i.e., financial inclusion — in the aftermath of COVID-19. This study is thus an attempt to determine the challenges encountered in the widespread implementation of EPS and the goal of universal financial inclusion in Iraq. The study's findings will be helpful for policymakers, Iraqi banking system, and consumers, since it arrives at useful insights through data analysis. A few earlier studies conducted in Iraq have focused on various other aspects of electronic payment systems, such as risk management (AL-mamoorey & Al-Rubaye, 2020); e-wallet usage (Sulaiman, 2023); financial inclusion and financial performance (Te-aeis, 2024); lack of economic growth due to cash-only payment (Yao et al., 2023); e-commerce (Hasanien, 2020); and profitability (Sameer, 2020). The current study, however, is a first-of-its-kind attempt to identify the challenges encountered in achieving financial inclusion in Iraq from the perspective of electronic payment methods.

2. Literature Review

This section reviews earlier studies that discuss the multi-factorial aspects of electronic payment methods in Iraq, financial inclusion aspects and their sub-constructs, and challenges faced in the adoption of electronic payment methods. It also provides an overview of the constructs of financial inclusion,

such as use, availability, ease of access, costs and commissions, awareness, consumer protection, and the quality of banking service. Section 2.1 discusses the dimensions of electronic payment methods, such as payment methods and their mental image, while Section 2.2 details six dimensions of financial inclusion.

2.1. Electronic Payment Methods in Other Countries

Shaparak, a national-level mobile payment system, was introduced by the Iranian government to drive digital financial inclusion and expand the cashless economy across the nation. The system encompassed digital payment providers, financial institutions and conventional banking players, and it achieved outstanding results, including high accessibility to financial services, even in remote areas (Elouaourti & Ibourk, 2024). The factors behind this embrace of the instant payment system were many, including favourable regulatory practices, increased consumer demand for speed and convenience, higher penetration of mobile technology, and heightened digital infrastructure. Górka (2025) analysed instant payment systems used in five countries: Brazil, India, USA, Poland and EU. The review identified major thrust areas, and how a collaboration among policy and regulatory measures, non-bank FinTech, and Big Tech players can effectively help a country adopt electronic payment systems.

The impact of electronic payment systems on the accounting systems of Jordanian governmental institutions has also been studied (Saleh et al., 2024). The study confirmed the efficacy of accounting systems and how they are more reliable, effective and secure under the safer and more user-friendly electronic payment systems. According to a recent report, the Central Bank of the UAE will be launching a digital currency called the Digital Dirham to fulfil the expectations of digital economy in terms of instant settlements and all-inclusive accessibility with security and trust. The Digital Dirham is set to reduce risk and gain widespread usage through safe and secure access for all use cases, including retail, wholesale and cross-border transactions (Jobst et al., 2025). A regional payment system (GCC RTGS) was developed by six GCC countries — Saudi Arabia, UAE, Bahrain, Kuwait, Oman and Qatar — intends to efficiently deliver intra-GCC payments cross-nationally. According to a report by Barclays, it intends

to not only standardize cross-border transactions, but also increase the efficiency, transparency, and reduce costs, among other benefits (Bhattacharya, 2023).

2.2. Electronic Payment Methods in Iraq

Niankara & Traoret (2023) analysed the influence of demand-side financial inclusion indicators on the adoption of digital payment solutions (DPS) in the Gulf Cooperation Council. Relying on secondary data collected during 2014 and 2017, the authors found no influence of gender, transaction account or debit card ownership on the adoption of DPS. However, the rest of the parameters, such as those who have savings accounts, credit cards, transfer receipts, or past utility bill payments, as well as those who require emergency funds, have higher chances of adopting digital payment systems.

AL-mamoorey & Al-Rubaye (2020) analysed the impact of electronic payment methods on risk mitigation in the Iraqi banking sector. The authors looked at the secondary data collected from the banks between 2012 and 2018 and various risks related to EPS such as banking, credit and liquidity, credit followed by operational and liquidity risks were analysed. The findings confirmed that the sample banks from which the data was collected, failed to fulfil the quality of the assets, and thus the banks remain at high credit risk and low liquidity.

In an earlier study, Al-Khazraji (2020) confirmed the presence of a significant positive relationship between electronic banking services and financial inclusion. For this study, the authors collected data from 270 Iraqi banking employees. and the results revealed knowledgeable insights about the importance of e-banking systems and how far it has increased the participation of people, who were earlier into informal payment systems.

In another earlier study, Al-Sabaawi, Alshaher & Alsalem (2021) analysed the factors that tend to impact the intention of users towards the adoption of e-payment systems in Iraq. The authors collected 339 e-payment system users, and the data was analysed for SEM. The outcomes confirmed that the expectations of effort performance and effort; social influence; orientation toward cost-saving; and facilitating conditions all tend to influence the users towards adopting the technology.

In their report on the availability of electronic payment methods in Erbil City, Iraq, AL-Saji (2019)

found that banks display a strong interest in the adoption of electronic payment methods so as to increase the quality of their service offerings and attract new customers. The study also found that the usage of EPS has been largely restricted to those with internet and knowledge of computers. It was recommended by the authors that the banks should raise public awareness about the ease and importance of electronic payment methods so as to foster trust and confidence among them.

E-commerce solutions have also attracted companies' interest because the number of consumers shopping online has increased tremendously. With convenience, secure and smooth payment experience, customers can enjoy a hassle-free shopping experience with the adoption of electronic payment systems (Garrouch, 2021). Jaafar and Alzubaidy mentioned that the electronic payment systems can be relied upon since the Central Bank assures consumers about confidentiality and privacy of their transactions (Jaafar & Alzubaidy, 2019).

In Iraq, electronic payment has begun via mobile phones, though its widespread usage is still under question. However, the data obtained from the Central Bank of Iraq are encouraging, as they reveal the growing interest among Iraqi population in the adoption of electronic payments. Table 1 shows data collected from various sources pertaining to the volume of transactions made for a period of seven years spanning 2017 and 2023. It also provides an overview of the number of conversion transactions — i.e., inward flow.

Table 2 shows the number of outlets available for receiving money or conducting financial transactions in Iraq. It shows the type of electronic cards, as most individuals prefer not to use electronic cards for daily purchases. This implies a lower prevalence of cash distribution outlets or ATMs in Iraq.

Various researchers (AL-Saji, 2019; Sahi et al., 2021; Alsamman, Alshaher & Alsamman, 2022; Sulaiman, 2023) mentioned that some of the challenges faced in Iraq around the adoption of electronic payment methods include high preference for cash payments; multiple currencies and payment methods; absence of a user-friendly, safe and legally-valid interface that can provide high-end technical support to vendors; customers' relationship with the banking system; lack of technological literacy; processing fees; and bad experiences involving corruption, US sanctions, and the like (Dimitrova, Öhman & Yazdanfar, 2022).

Table 1. Electronic payments through mobile companies in Iraq via multiple platforms (Zain + Asia + Nasspay)

Year	Amounts (in Iraqi dinars)	Number of conversion transactions
2017	170,394,031,598	1,032,215
2018	386,401,630,041	1,036,374
2019	858,128,262,349	2,044,931
2020	1,402,301,877,536	5,192,534
2021	913,356,442,253	3,799,149
2022	1,069,699,244,744	5,483,198
2023	4,172,865,638,307	8,512,101

Source: Authors' own research based on statistics from the Central Bank of Iraq (<https://cbi.iq/page/142>)

Table 2. Outlets providing financial services and wallets

Year	Number of ATMs	Number of electronic wallets	Number of POC points	Number of POS points
2017	656	222,442	5,143	918
2018	865	271,906	6,625	2,200
2019	1,014	403,797	11,677	2,226
2020	1,340	1,226,235	13,796	7,540
2021	1,566	2,107,265	14,704	8,329
2022	2,223	2,970,390	17,610	10,718

Source: Authors' own research based on statistics from the Central Bank of Iraq (<https://cbi.iq/page/142>)

Sameer (Sameer, 2020), the authors analysed the relationship between the electronic payment systems and Iraqi commercial banks' profitability. The authors found the presence of a statistically-significant moral effect relationship between the variables. The study confirmed that the banks gained much profits when they embraced technology in their payment systems.

When issuing the power to develop electronic payment methods, commercial banks and other financial institutions in a country can cooperate with the central bank in developing a lower-cash economy. This increases the stability and liquidity of the formal banking system. When new electronic payment methods are issued, the money supply increases as more money goes into circulation. This increase is reflected in higher income and reduced interest rates

for both individuals and businesses. This cascading phenomenon stimulates investment, a business-friendly environment and increased aggregate demand, as well as aggregate output (-Gravi, 2023).

2.3. Mental Image and Perceptions

This dimension represents various aspects like customer satisfaction and comfort; the responsiveness and timeliness of service rendered by e-payment service providers; how providers personalise their service offerings; and how instant transfer of funds are discussed. Digital payment systems are facilitated by ease of use, social influence, higher education and gender of the individual, while some of the primary concerns to be addressed include security and limited technical infrastructure. Susanto, Solikin & Purnomo (2022) cited trust, perceived risk, satisfaction, security and social influence as some of the factors that facilitate the adoption of digital payment services. Convenience and getting comfortable remain one of the key drivers of adopting electronic payment systems, along with trust, social influence also influence its adoption (Nandru & Senthilkumar, 2024). A review conducted by Febrianto et al., (2023) confirmed that adoption of digital payment systems is influenced by user convenience, digital adoption practices, user attitudes, and the readiness of organizations. User-friendly interfaces developed by the digital payment service providers help customers embrace technology for their financial transactions. Such customers expect quick, safe and secure transactions and a dedicated customer-friendly experience from digital payment service providers (Karthikeyan, 2023).

2.4. Financial Inclusion

Financial inclusion refers to the affordability and accessibility of financial services for individuals and businesses, including transactions, payments, savings, credit, and insurance, and whether they are delivered in a responsible and sustainable manner. Financial inclusion helps reduce poverty levels and is considered a key enabler for reducing extreme poverty and promoting shared prosperity (Abel, Mutandwa & Le Roux, 2018; Omar & Inaba, 2020).

The absence of financial inclusion can have broader macroeconomic consequences. It can harm both the equity and the efficiency of the banking system by

reducing access to credit, which remains a crucial component for the development, entrepreneurship, homeownership, and economic development in general. Availability of credit also helps ensure that those who may be uneducated or ill-informed about financial matters remain confident in the financial system (Khan, Siddiqui & Imtiaz, 2022).

Some of the challenges associated in achieving financial inclusion include lack of awareness and trust in financial institutions; high fees and costs; absence of technical infrastructure; and lack of legal provisions, including corruption (Malladi, Soni & Srinivasan, 2021; Kumar, Raj K & Kumar, 2022). Structural factors and policy factors, such as encouraging a competitive environment for banking services and channelling government payments through bank accounts, play an important role in promoting financial inclusion. Reliable and comprehensive data that capture different dimensions of financial inclusion are also a critical requirement for evidence-based policymaking. Financial inclusion has been on the rise across all population groups, and it has seen significant improvements in many countries. However, various barriers still exist for accessing financial services (Al-Rafi'i, 2020).

Financial inclusion is achieved by encouraging citizens to open accounts of all types in banks and deposit money in them so that they can be a part of the formal banking system. This is considered a fundamental pillar in achieving financial inclusion. Table 3 shows the number of operating bank accounts in Iraq for a period of six years spanning 2017 to 2022. Though the number of accounts has increased slowly, the improvement has been steady, especially in the aftermath of COVID-19. However, there is still much space for improvement, considering the fact that the population of Iraq has exceeded 42 million, and most of this population would be considered working class, and they too must be included in the formal banking system. Table 4 shows the type and the number of electronic cards used by Iraqi population. As observed from the number of accounts, the number of electronic debit and prepaid cards has consistently increased from 2017 to 2022, while electronic QI cards have drastically decreased in number. On the other hand, the increase in the number of credit cards seems to have been minimal, considering the population growth between 2017 and 2022.

Financial inclusion has been approached by various researchers who have defined different types of sub-constructs in their research works. According

Table 3. Number and type of bank accounts in Iraq

Year	Number of company accounts	Deposit account number	Number of savings accounts	Number of current accounts
2017	91,460	20,811	634,280	614,483
2018	101,881	23,202	731,835	773,759
2019	355,904	83,612	1,446,969	1,153,037
2020	470,074	186,036	3,489,040	1,981,826
2021	573,205	191,955	3,915,175	2,016,322
2022	655,828	226,223	4,999,188	2,914,652

Source: Authors' own research based on statistics from the Central Bank of Iraq (<https://cbi.iq/page/142>)

Table 4. The type and number of electronic cards used in Iraq, which was found to be quite small compared to the size of the population

Year	Number of electronic debit cards	Number of electronic credit cards	Number of prepaid cards	Number of electronic QI cards
2017	127,594	15,158	6,234,553	6,086,703
2018	872,894	22,067	7,915,069	6,639,582
2019	1,460,891	38,883	9,006,951	1,819,901
2020	2,811,503	46,469	8,891,436	1,384,677
2021	5,083,997	50,927	9,771,370	-
2022	5,430,434	61,320	10,711,017	-

Source: Authors' own research based on statistics from the Central Bank of Iraq (<https://cbi.iq/page/142>)

to (Kumari, 2021), financial inclusion has four primary constructs: access, quality, usage, and impact of financial transactions. Te'aeis (2024) analysed the concept of financial inclusion in terms of utilization, quality and access to financial services. On the other hand, Sharma & Changkakati (2022) analysed financial inclusion using the dimensions of access, usage, and quality.

In an earlier systematic review conducted earlier, (Pesqué-Cela et al., 2021) mentioned that financial inclusion should be treated as a multidimensional concept. It can be approached using quantitative dimensions such as aggregate level of access and use, and qualitative ones, such as financial literacy, consumer protection and product appropriateness.

Table 5. Financial inclusion – Dimensions

S. No	Financial inclusion dimension	References
	Use	(Pesqué-Cela et al., 2021; Sharma and Changkakati, 2022)
	Availability	(Firas Farhan, 2022; Prasuna, Kasturi and Annemalla, 2024)
	Easy access	(Pesqué-Cela et al., 2021; Sharma and Changkakati, 2022)
	Costs and commissions	(Pesqué-Cela et al., 2021; Damra, Yasin and Albaity, 2023)
	Awareness and consumer protection	(Pesqué-Cela et al., 2021; Shastri, 2023)
	Quality of banking service	(Pesqué-Cela et al., 2021; Sharma and Changkakati, 2022)

Source: Authors' own research

The authors named access, use, ease/cost and quality as the four primary dimensions of financial inclusion.

Prasuna, Kasturi & Annemalla (2024) surveyed various Indian states to determine the status of financial inclusion from the perspective of three dimensions: availability, penetration and usage. The results underscored how making the services available to the public can increase financial inclusion. (Shastri, 2023) emphasized the importance of financial literacy and inclusion among customers in ensuring that banking products and services are well-received by their target audience. Financial inclusion can be identified as contributing to financial stability, while financial literacy has an association with financial intermediaries and lesser account costs. In other words, customers who can access formal financial services exhibit far more confidence in banks (Damra, Yasin & Albaity, 2023).

Recently, Te'aeis (2024) analysed the impact of financial inclusion on the financial performance of Iraqi commercial banks. The author analysed different dimensions of financial inclusion, such as utilization, quality and access to financial services. For this research, they collected data from 307 customers who were associated with Iraqi commercial banks. The analytical findings revealed that all the three factors had a significant impact on the financial performance of the banks under study. The author recommended the development of a highly-reliable and secure financial system that can provide trustworthy services to customers.

In the case of the Nigerian electronic payment system, a study found that the factors like income level, availability of internet services, PoS machines and mobile banking services and financial inclusion are crucial in increasing the penetration of e-payment adoption in Nigeria (Oyelami, Adebisi & Adegunle, 2020). They also listed barriers that prevent the

consumers from financial inclusion, including lack of financial literacy, eligibility, affordability, physical access and/or income. The International Labor Organization has mentioned the existence of regulatory barriers to achieving full financial inclusion, in addition to collateral-based funds, mistrust in the banking system, low-income households, illiquidity, and looting of deposits (International Labour Organization, 2023). (Firas Farhan, 2022) assessed the association between financial inclusion and female empowerment in Iraq. The authors considered the factors of financial inclusion to include owning a bank account, card, bank savings, as well as borrowing from formal and informal financial institutions and receiving a salary from either the public or the private sector. Based on the outcome of the data analysis, it can be inferred that the participation of women in formal banking system is poor, and this indicates their economic weaker position in the society. The study thus suggested involving women in digital financial services if they are to achieve true empowerment. Table 5 shows the dimensions used for financial inclusion and the studies used as a reference for these dimensions.

3. Methodology

In order to achieve its research objectives, this study followed a cross-sectional quantitative research approach. Our independent variable in electronic payment methods (Daoud, 2020; Abdul Hussein, 2023) contained two dimensions — the payment methods and mental image and perception — while our dependent variable was financial inclusion. The following list is of the dimensions used in the study for financial inclusion, as per our literature (Al-Khazraji, 2020; Pesqué-Cela et al., 2021; Sharma and Changkakati,

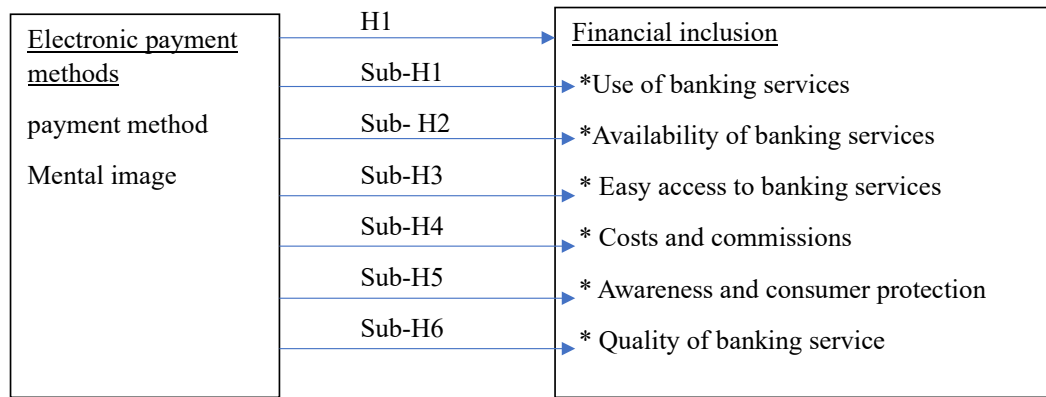


Figure 1. Research model adopted for the study

Source: Authors' own research

2022; Gharbi and Kammoun, 2023; Hassan, 2023): use, availability, easy access, costs and commissions, awareness and consumer protection, and quality of banking service. A semi-structured questionnaire was developed, comprised of 13 questions pertaining to payment methods and 11 questions about perceptions and mental image for the independent variable.

In case of dependent variable, the questions encompassed use (six questions), access (six questions), ease of access (three questions), costs and commissions (four questions), and awareness and consumer protection (four questions). A five-point Likert scale was adopted in the questionnaire, in which 5 corresponded to "strongly agree" and 1 corresponded to "strongly disagree." The questions for the variables and the dimensions were sourced from the literature as mentioned above, and were used as is. The study focused on individuals employed in various industries, and a random sampling technique was used. The authors had access to data from potential respondents in the governorate of Karbala, Iraq; data was thus collected from employees in the Karbala governorate about the role played by electronic payment methods in enhancing financial inclusion. Out of the total responses received, a total of 958 responses was considered for final analysis after removing redundant, repetitive and unfilled questionnaires.

Based on the research question, the following hypotheses have been framed for the study.

Main hypothesis: There is a significant influence relationship between electronic payment methods and financial inclusion.

For this main hypothesis, six sub-hypotheses have been framed in this study.

First sub-hypothesis: There is a significant influence relationship between electronic payment methods and the use of banking services.

Second sub-hypothesis: There is a significant influence relationship between electronic payment methods and the availability of banking services.

Third sub-hypothesis: There is a significant influence relationship between electronic payment methods and ease of access to banking services.

Fourth sub-hypothesis: There is a significant influence relationship between electronic payment methods and costs and commissions.

Fifth sub-hypothesis: There is a significant influence relationship between electronic payment methods, awareness, and consumer protection.

Sixth sub-hypothesis: There is a significant influence relationship between electronic payment methods and the quality of banking service.

Based on the above hypotheses, the study model is shown in Figure 1.

In this study, the PLS-SEM technique was used, while Harman's single factor test, Cronbach's alpha and the structural model validation were also performed to prove or reject the hypothesis.

4. Results

The collected data was analysed using the Structural Equation Modelling (SEM) technique, while individual item reliability, convergent reliability, and discriminant validity were also measured. PLS is generally

Table 6. Descriptive statistics

<i>Construct</i>	<i>Not.</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Skewness</i>	<i>Kurtosis</i>
Payment method	PAY	958	4.594	0.362	-0.497	-0.919
Mental image and perception	MEN	958	4.453	0.417	-0.236	-0.992
Use of banking services	USE	958	4.532	0.530	-0.862	0.316
Availability of banking services	AVAIL	958	4.528	0.355	-0.464	0.594
Easy access to banking services	ACC	958	4.108	0.662	-0.126	-1.214
Costs and commissions	COST	958	4.352	0.473	-0.639	0.244
Awareness and consumer protection	AWAR	958	4.284	0.593	-0.546	0.378
Quality of banking service	QUAL	958	4.326	0.443	-0.175	-0.672
Electronic payment methods	ELEC	958	4.524	0.364	-0.246	-1.423
Financial inclusion	FIN	958	4.355	0.415	-0.384	-0.015

Source: Authors' own research based on statistics from the Central Bank of Iraq (<https://cbi.iq/page/142>)

recommended as the most fully developed system for variance-based structured equation modelling. The current study adopted PLS path modelling because of its wide utilization in management related domains, and the goal of this research work is to predict the dependent variable based on an explanatory approach. PLS path modelling was chosen as an appropriate investigative approach using SmartPLS 3 software (Hair et al., 2021). Harman's single-factor test was also used to investigate the common method bias. The proportion of the factor's explained variation for the common factor (37%) was less than 50%, thus suggesting that this issue was not present (MacKenzie & Podsakoff, 2012).

4.1. Descriptive Statistics and Multiple Correlations

The descriptive statistics and various correlations between the selected constructs are shown in this section. Table 6 shows the mean (M) and standard deviation (SD) of the constructs considered in the study.

The electronic payment methods construct has a higher mean and lower variability ($M = 4.524$, $SD = 0.364$) compared to financial inclusion ($M = 4.355$, $SD = 0.415$). Between the dimensions of electronic payment methods, payment method has a higher mean and lower variability ($M = 4.594$, $SD = 0.362$) compared to mental image and perceptions ($M = 4.453$, $SD = 0.417$). Among the dimensions of the financial inclusion construct, the use of banking services has the highest mean ($M = 4.532$) compared to other dimensions. The

skewness levels of -2 to +2 and kurtosis values of -7 to +7 are regarded as acceptable for demonstrating normal distribution (Hair et al., 2014; Byrne, 2016). Table 6 shows that the skewness and kurtosis values for the constructs were within the desired range.

4.2 Measurement Model Assessment

Figure 2 and Table 7 show the measurement model outcomes for the variables under study.

The reliability indicators —Cronbach alpha (CA), rho_A (rho), and composite reliability (CR) — have been set to be 0.6 or above (Fornell & Larcker, 1981). As shown in Table 7, all the reliability indicators for each item in the current study were above the threshold value, thus indicating that the constructs examined in this study have an appropriate internal consistency. Previous research suggested that the outer loadings of each item for all the constructs should be equal to or greater than 0.40.

In this investigation, all the individual item loadings were above 0.4. Hair et al., (2021) recommended that the AVE should be 0.50 or higher in order to assess the convergent validity of each component. The AVE for all the items reached the required threshold of 0.50; however, values greater than 0.4 are also acceptable, provided that the CR values are greater than 0.6. The results in Table 7 below show that the constructs utilized in this investigation have appropriate convergent validity as well.

Another approach recommended to ensure the validity is to determine HTMT (Heterotrait-

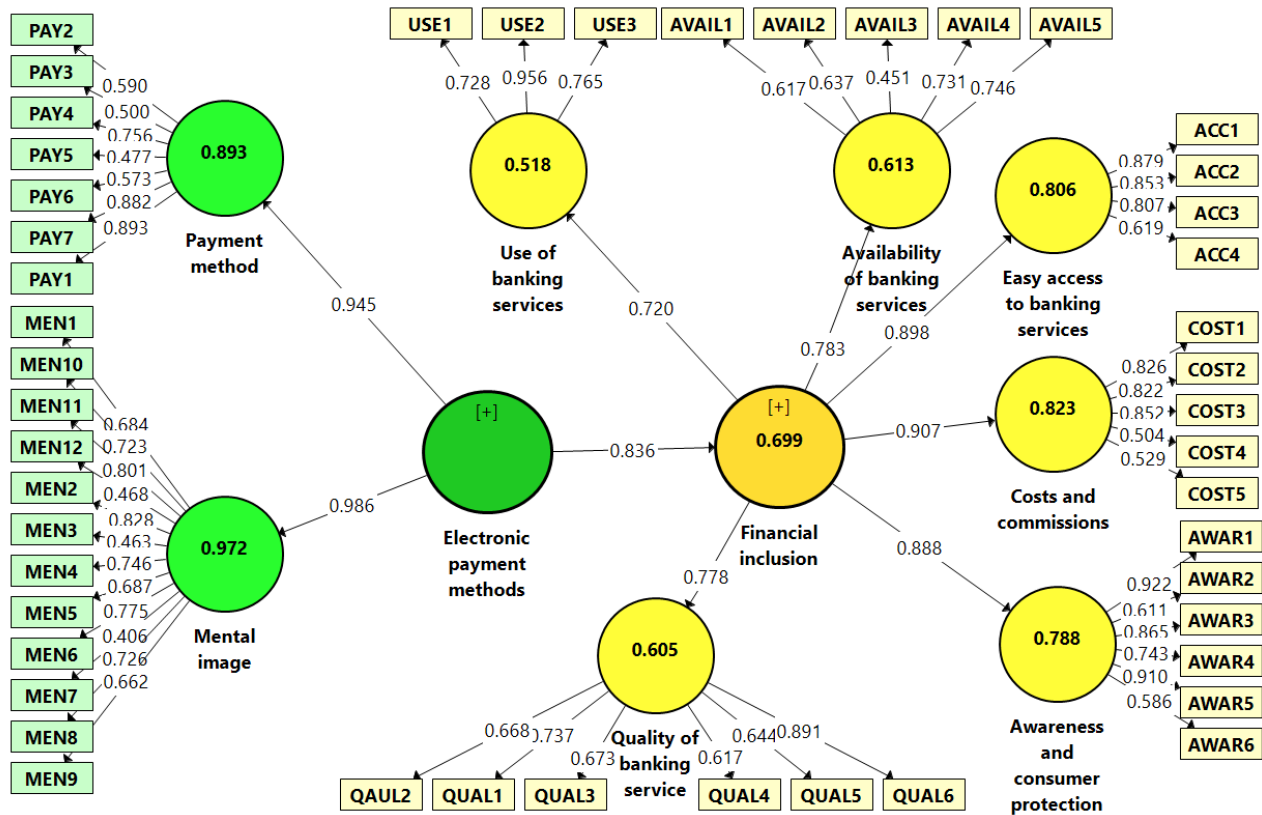


Figure 2. Measurement model
Source: Authors' own research

Table 7. Measurement model

Construct	Item	Cronbach's Alpha	rho_A	CR	AVE	Loading
Payment method	PAY1	0.799	0.855	0.855	0.472	0.893
	PAY2					0.590
	PAY3					0.500
	PAY4					0.756
	PAY5					0.477
	PAY6					0.573
	PAY7					0.882
Mental image	MEN1	0.887	0.907	0.907	0.459	0.684
	MEN2					0.828
	MEN3					0.463
	MEN4					0.746
	MEN5					0.687
	MEN6					0.775
	MEN7					0.406
	MEN8					0.726
	MEN9					0.662
	MEN10					0.723
	MEN11					0.801
	MEN12					0.468

Continued **Table 7.** Measurement model

Construct	Item	Cronbach's Alpha	rho_A	CR	AVE	Loading
Use of banking services	USE1	0.751	0.798	0.861	0.677	0.728
	USE2					0.956
	USE3					0.765
Availability of banking services	AVAIL1	0.66	0.669	0.776	0.416	0.617
	AVAIL2					0.637
	AVAIL3					0.451
	AVAIL4					0.731
	AVAIL5					0.746
Easy access to banking services	ACC1	0.799	0.805	0.872	0.634	0.879
	ACC2					0.853
	ACC3					0.807
	ACC4					0.619
Costs and commissions	COST1	0.765	0.826	0.84	0.523	0.826
	COST2					0.822
	COST3					0.852
	COST4					0.504
	COST5					0.529
Awareness and consumer protection	AWAR1	0.871	0.916	0.903	0.616	0.922
	AWAR2					0.611
	AWAR3					0.865
	AWAR4					0.743
	AWAR5					0.910
	AWAR6					0.586
Quality of banking service	QUAL1	0.8	0.828	0.858	0.505	0.737
	QAUL2					0.668
	QUAL3					0.673
	QUAL4					0.617
	QUAL5					0.644
	QUAL6					0.891

Source: Authors' own research

Table 8. Discriminant validity

	1	2	3	4	5	6	7	8
1. Availability of banking services								
2. Awareness and consumer protection	0.740							
3. Costs and commissions	0.867	0.832						
4. Easy access to banking services	0.889	0.929	0.967					
5. Mental image and perception	0.894	0.823	0.992	0.837				
6. Payment method	0.976	0.578	0.910	0.673	0.989			
7. Quality of banking service	0.725	0.688	0.726	0.704	0.868	0.704		
8. Use of banking services	0.631	0.633	0.876	0.646	0.947	0.775	0.71	

Source: Authors' own research

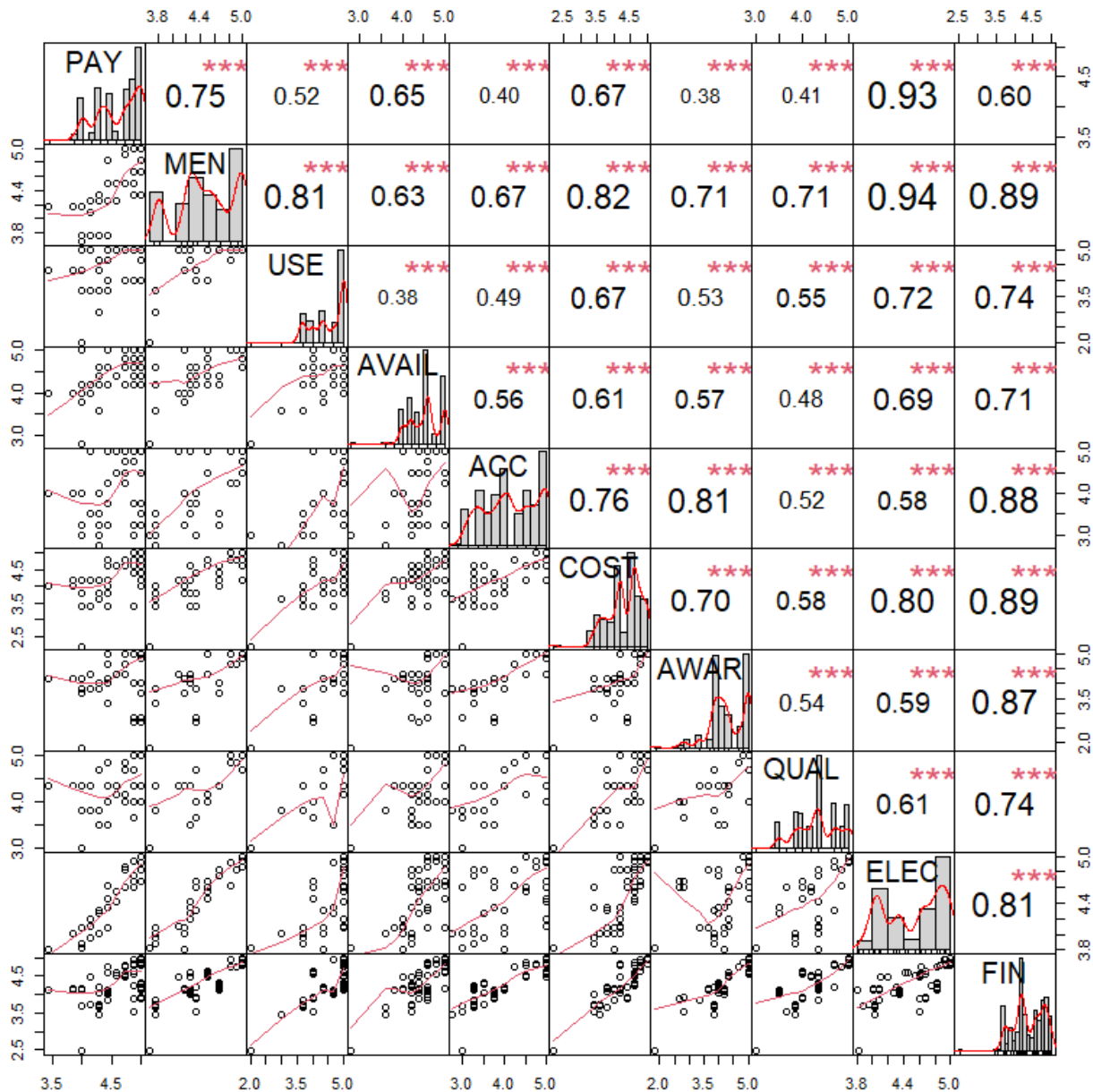


Figure 3. Visualization of scatter plots, distributions and correlations
Source: Authors' own research

Monotrait) ratio for testing the discriminant validity. (Gaskin, Godfrey & Vance, 2018) proposed that the value of constructs should not exceed 1. The results in Table 8 illustrate that the maximum construct found was 0.992, and so the discriminant validity was found to be constructed.

4.3. Multiple Correlation

To establish the degree and direction of the association among the specified constructs, Pearson product-moment correlation coefficient analysis

was conducted. The correlation coefficients marked with three stars (***) were significant at 0.001; correlation coefficients marked with two stars (**) were significant at 0.01; coefficients marked with one star (*) were significant at 0.05; and finally, the coefficients that are not marked were not significant at 0.05, i.e., they had p-values are higher than 0.05. Figure 3 shows scatter plots for each pair of numeric variables. The Pearson correlation coefficients are shown on the right with their statistical significance. A variable distribution with the fitted normal curve was constructed diagonally. The results indicate that there exists a significant positive strong relationship

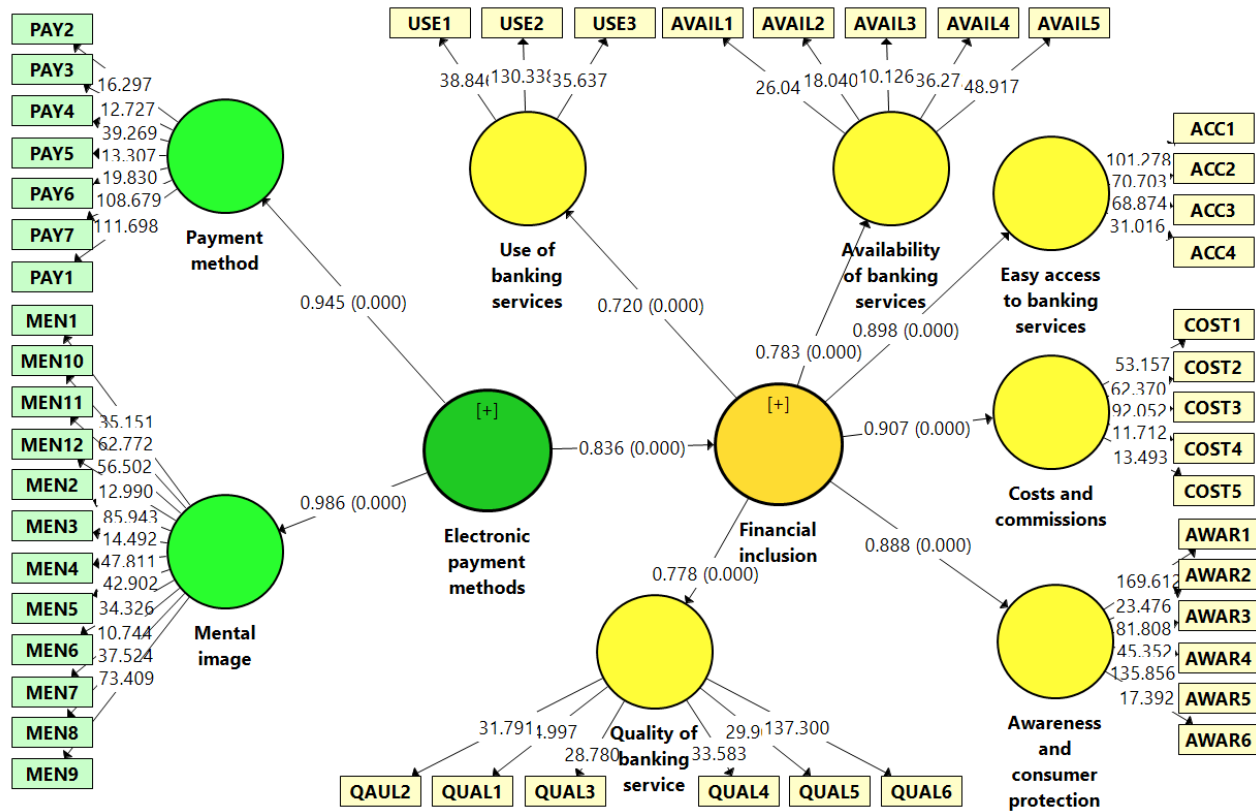


Figure 4. Structural model (Main Hypothesis)

Source: Authors' own research

between the electronic payment methods and financial inclusion, since $r = .81$ and $P < 0.001$. They also indicated that mental image and perception has a significant positive strong relationship with financial inclusion ($r = .89$, $P < 0.001$), while payment method has a significant moderate positive relationship with financial inclusion ($r = .60$, $P < 0.001$).

4.4. The Structural Model

Path coefficients, collinearity diagnostics, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and global goodness-of-fit criteria were used in this study to examine the structural model. Prior to analysing the structural model, collinearity was investigated across the constructs using variance inflation factors (VIF), and all the values were determined to be less than the threshold of 5 (Hair et al., 2021), as shown in Table 10. For the current investigation, 2,000 bootstrapped samples were employed for the sample observations to investigate the significance of the path coefficients.

The full estimates of the structural equation model are shown in the figures, 4 and 5. As per Table 9:

H1 shows that electronic payment methods have a positive and significant effect on financial inclusion ($\beta = 0.836$, $t = 60.02$, $p < 0.001$).

H1.1 states that electronic payment methods have a positive and significant effects on the use of banking services ($\beta = 0.749$, $t = 45.03$, $p < 0.001$).

H1.2 confirms that the electronic payment methods have positive and significant effects on the availability of banking services ($\beta = 0.747$, $t = 64.31$, $p < 0.001$).

H1.3 demonstrates that electronic payment methods have a positive and significant effect on easy access to banking services ($\beta = 0.744$, $t = 57.51$, $p < 0.001$).

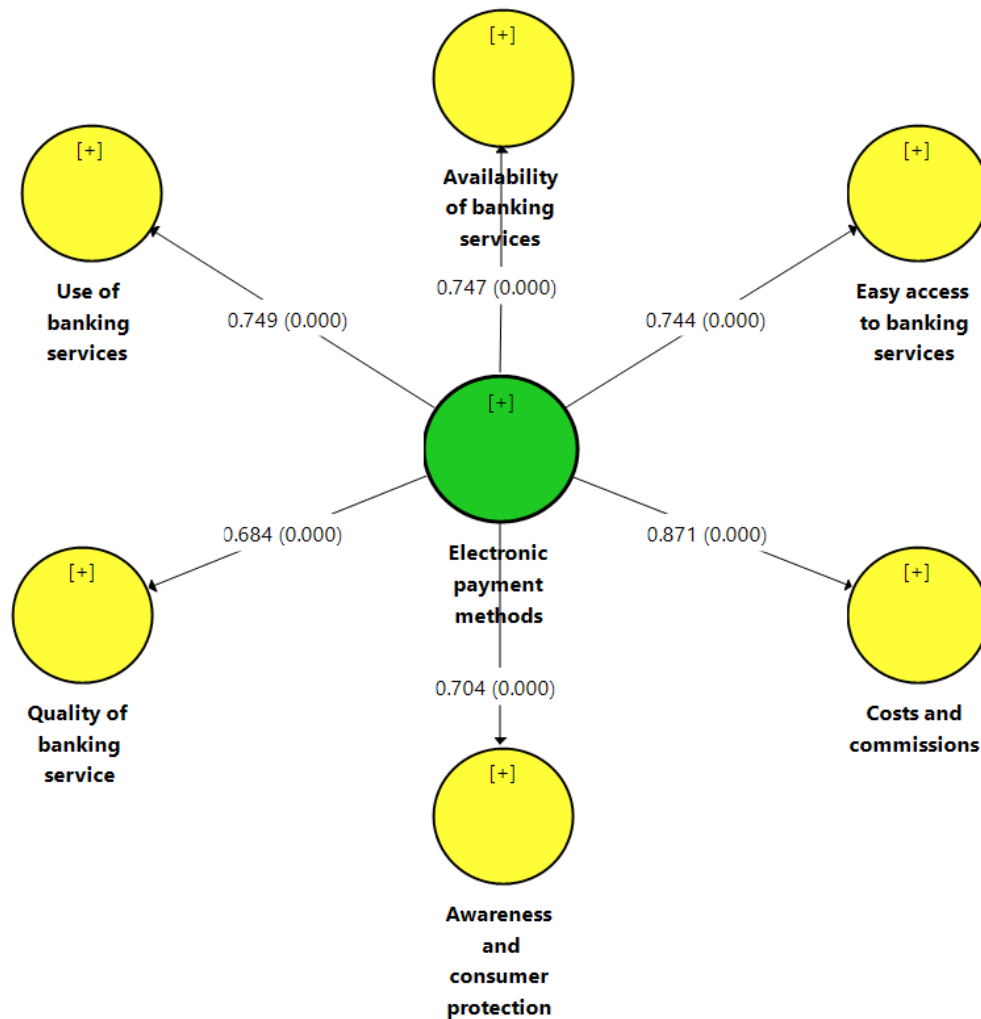
H1.4 reveals that the electronic payment methods have a positive and significant effect on costs and commissions ($\beta = 0.871$, $t = 107.42$, $p < 0.001$).

H1.5 suggests that the electronic payment methods have a positive and significant effect on awareness and consumer protection ($\beta = 0.704$, $t = 42.12$, $p < 0.001$).

Table 9. Path coefficients and hypothesis testing

H	Path	B	t-value	P-value	95% Bias-Corrected CI		Remark
					LB	UB	
H1	Electronic payment methods -> Financial inclusion	0.836	60.02	< 0.000	0.808	0.862	Supported
H1.1	Electronic payment methods -> Use of banking services	0.749	45.03	< 0.000	0.714	0.779	Supported
H1.2	Electronic payment methods -> Availability of banking services	0.747	64.31	< 0.000	0.723	0.768	Supported
H1.3	Electronic payment methods -> Easy access to banking services	0.744	57.51	< 0.000	0.719	0.77	Supported
H1.4	Electronic payment methods -> Costs and commissions	0.871	107.42	< 0.000	0.853	0.885	Supported
H1.5	Electronic payment methods -> Awareness and consumer protection	0.704	42.12	< 0.000	0.671	0.737	Supported
H1.6	Electronic payment methods -> Quality of banking service	0.684	51.36	< 0.000	0.657	0.709	Supported

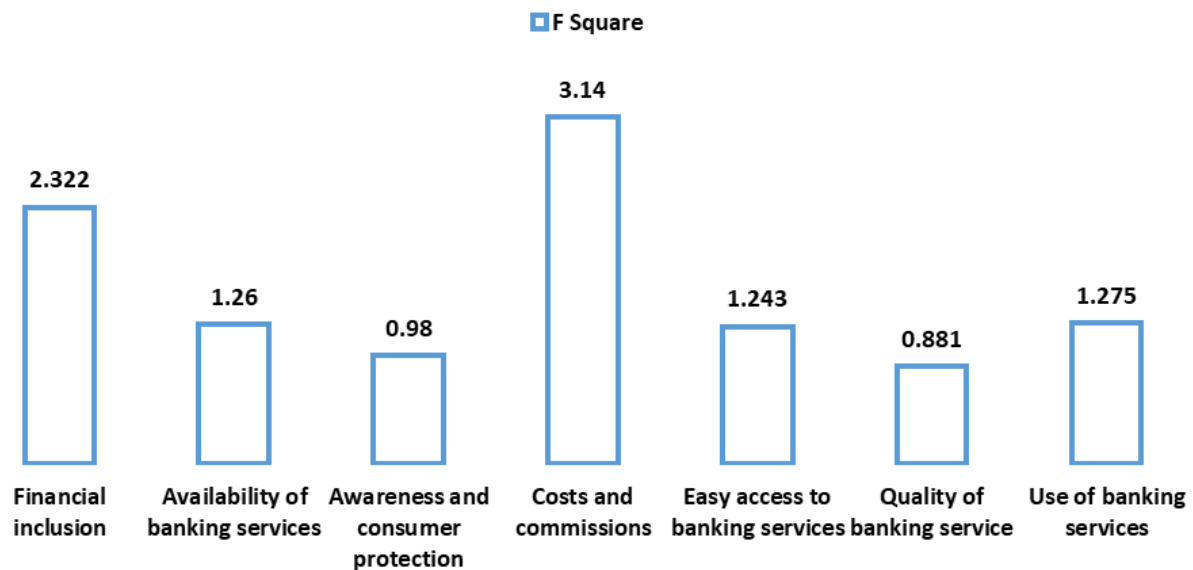
Source: Authors' own research

**Figure 5.** Structural model (sub-hypothesis)

Source: Authors' own research

Table 10. Structural model assessment

Independent Variable	Dependent Variable	R Square	Q Square	F Square	VIF
Electronic payment methods	Financial inclusion	0.699	0.259	2.32	1
	Availability of banking services	0.558	0.211	1.26	1
	Awareness and consumer protection	0.495	0.259	0.98	1
	Costs and commissions	0.758	0.388	3.14	1
	Easy access to banking services	0.554	0.299	1.24	1
	Quality of banking service	0.468	0.220	0.88	1
	Use of banking services	0.560	0.371	1.27	1

**Figure 6.** Visualization of effect size
Source: Authors' own research

H1.6 indicates that the electronic payment methods have a positive and significant effect on the quality of banking service ($\beta = 0.684$, $t = 51.36$, $p < 0.001$).

According to Hair et al. (2021), the values of F^2 (effect Size) should be higher than 0.02. The current study confirmed that all the values of F^2 across all the hypotheses were higher than 0.02. This establishes the effect, as shown in Table 6 and Figure 6. *Coefficient of determination* (R^2), also known as R^2 value assessment, was calculated using the PLS-SEM structural model. R^2 indicates the independent variance of a variable using its predictors. In general, an R^2 of 0.10 is considerable (Falk & Miller, 1992). We note from Table (10) the variance inflation factor is equal to 1, which indicates the complete independence of the indicator from other indicators and results in the most reliable estimates. It indicates that coefficient of this

variable is not distorted due to correlations with other predictors, and the standard error is at the lowest level.

In PLS-SEM, an R^2 value of 0.60 is considered substantial, 0.33 as moderate, and 0.19 as weak (Chin and Marcoulides, 1998). In the present study, all the values were above the threshold of 0.10 and thus ranged from moderate to substantial. Our the results indicate, then, that about 70% of the variation in financial inclusion can be explained by the variation in EPS. The results of R^2 for the dimensions ranged between (R^2 : Quality of banking service = 0.468) and (R^2 : Costs and commissions = 0.758), as shown in Figure 7. In this work, the cross-validated redundancy (Q^2) was employed to assess the impact of the latent variables. Table 6 shows the Q^2 values for the current study, which were greater than zero, demonstrating that the model has predictive relevance.

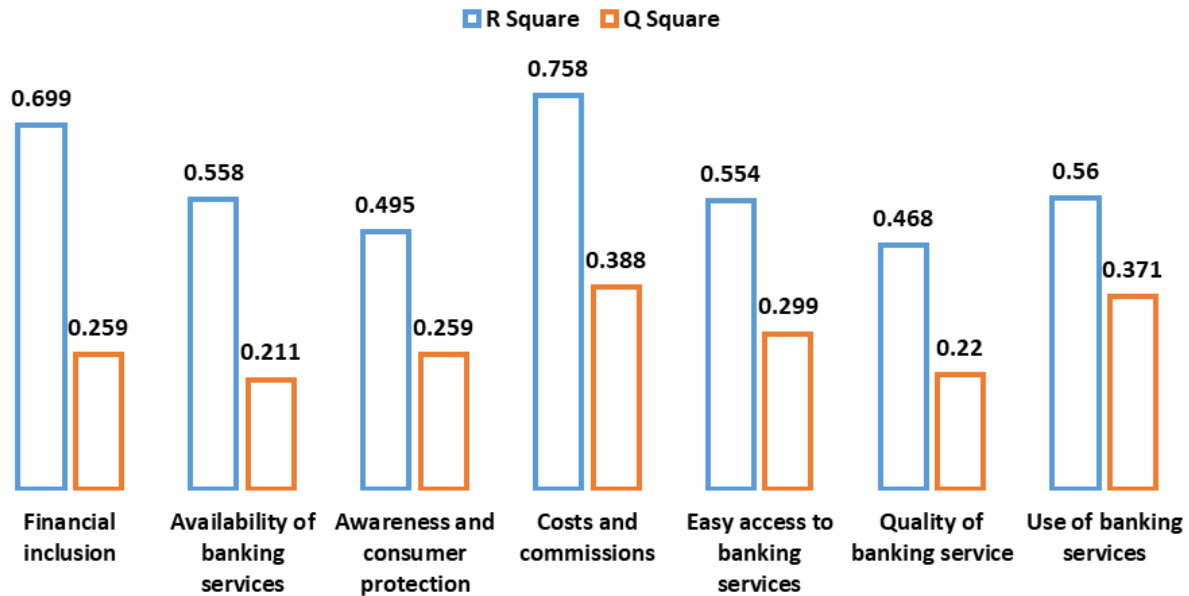


Figure 7. Visualization of R-Square (R^2) and Q-Square (Q^2)
Source: Authors' own research

5. Discussion and Conclusion

Electronic payment methods have reduced the dependence upon cash payment modes, lowered transaction costs, reduced geographical barriers, broken down barriers between the wealthy and the underprivileged, as well as overcome deficient infrastructure (Go-Globe, 2024). In the aftermath of COVID-19, the importance of cashless transactions has increased as people sought to avoid unnecessary travel or contact with the outside world. Cross-border transactions have increased compared to the pre-COVID-19 era, owing to the widespread adoption of EPS (Ernst Young, 2024). Digital finance was shaped during the pandemic, and it ultimately increased the accessibility and reduced gender discrimination in financial services. EPS still has its own challenges, including security and privacy issues, lower consumer awareness and a need for advanced infrastructure and skilled manpower; nonetheless, digital finance has paved the way for financial inclusion in a structured and desired manner (Yanting and Ali, 2023). The results of this study clearly convey that there exists a positive and significant relationship between all the dimensions of financial inclusion and electronic payment methods. In other words, it can be inferred that electronic payment methods heavily influence the customers' adoption formal banking system, owing to their use, availability, ease of access, consumer protections, quality, and reasonable costs

and commissions. Further, as confirmed by (Daoud, 2020), the mental image and perception of EPS has a significant and strong positive relationship with the financial inclusion dimensions. However, EPS themselves have a significant positive yet moderate relationship with that of the financial inclusion. (Pesqué-Cela et al., 2021) proved through confirmatory factor analysis that there is a significant relationship between electronic payment and financial inclusion, especially in terms of use, quality of banking services, and accessibility. The present study's results are in alignment with these results. This question should be further investigated in future, however, since the moderate relationship between these two variables may affect the widespread EPS adoption in customers who are unexposed to formal banking systems (Al-Rafi'i, 2020).

EPS was found to have a significant association with all six constructs of the financial inclusion variable. Among the dimensions, ease of access to the formal banking system in particular has been highlighted in the literature (Firas Farhan, 2022) since women's empowerment can only be achieved through this dimension. Dzogbenuku et al. (2022) highlighted how financial inclusion of women can be easily achieved through digitization of payment services, but in order to achieve this, the financial literacy of women and their accessibility to formal financial systems must be improved. As discussed in the literature (Cash Consortium for Iraq, 2022), most

people still seek financial assistance through informal means, such as borrowing from friends, or non-registered informal lenders within the community.

The current study results, too, confirm that the availability of banking services through electronic payment methods and their ease of access play a major role in increasing the customers' gravitation toward formal banking systems. Garrouch (2021) mentioned that convenience is one of the key drivers increasing the adoption of digital payment, and the results of the present study results are in alignment with this finding. Electronic payment methods have facilitated the digitization of government payments and financial transfers, which in turn has increased efficiency, transparency, and security in financial transactions. There is still a need, however, to address challenges related to digital literacy; work to reduce the costs of financial transactions; increase trust between individuals and banks; and encourage individuals to deal electronically (International Labour Organization, 2023).

The results of the present study indicate that about 70% of the variations in financial inclusion can be explained by the variations in the adoption of EPS. In this study, the authors made an attempt to determine the impact of electronic payment methods upon achieving financial inclusion in an Iraqi setting. In order to achieve this goal, the authors conducted a survey among the potential respondents in Iraq. Based on the analytical findings, it was inferred that the electronic payment methods have a significant and positive association with all the financial inclusion dimensions.

The present study does have its own limitations, as briefed herewith. Due to the limited accessibility in terms of data collection, the study population was restricted to employees working in the Karbala governorate of Iraq. The results thus cannot be necessarily be generalized to the rest of the governorates or the entire nation. Future studies should address this limitation by conducting the study across the nation to identify the factors that impact EPS adoption. Further, as this is a cross-sectional study, the study results may have brought a response bias. Future studies should follow a longitudinal approach, with which a consistent response can be obtained after a defined period of implementing EPS.

This present study is a first-of-its-kind attempt to determine the association between EPS and financial inclusion. Based on the study's findings, the researchers suggest the policymakers in the governments focusing

on instilling greater trust of banking institutions in consumers. This can be done in collaboration with NGOs that can raise awareness among the general public. Banking institutions must conduct outreach programs and invite SMEs to spread across countries in a region-wise manner so that they can in turn bring the customers into the banking system. An informal credit rating system should be developed for businesses as well as households so that the participants of this formal banking system can rely on it and encourage others to participate. Any risks borne by customers must be overcome with legal provisions, while high interest rates and the fear of corruption must be sorted out through strict adherence to these provisions.

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Appendix

The role of electronic payment methods in enhancing financial inclusion

Electronic payment methods

The first dimension: payment method

- 1 Paying employees' salaries through electronic means is a civilized and advanced phenomenon.
- 2 Paying salaries electronically will increase banking awareness among the bank's audience and encourage them to use financial services for purchases instead of receiving it in cash.
- 3 The commission deducted from the employee's salary is reasonable in exchange for the bank's services in the electronic payment process.
- 4 Electronic payment machines (ATM, POS) are available in many places close to my work or residential place.
- 5 Banking operations are carried out through electronic payment devices without errors.
- 6 Electronic payment devices accommodate salaries in proportion to the number of employees.
- 7 I find it easy to use electronic payment methods.
- 8 Multiple geographical locations for electronic payment methods.
- 9 Diversity of banking services via electronic payment methods.
- 10 I receive a free message directly from the bank after the salary is posted in my bank account.
- 11 Funds are constantly available at payment machines (ATMs) and meet cash withdrawal requirements.
- 12 After every withdrawal or deposit to my salary bank account, the bank deducts an annual sum of money from the notification letters I receive.
- 13 Customer service is available 24 hours a day, 7 days a year, when you contact them to solve a specific problem.

The second dimension, Mental image and perception

- 14 Electronic payment methods are of high quality and satisfy me.
- 15 I feel anxious and uncomfortable dealing with private banks.
- 16 I feel comfortable when dealing with government banks.
- 17 Private bank management responds quickly to customer needs.
- 18 The provision of banking services by private banks is according to the specified dates.
- 19 The banking services provided through electronic payment methods suit my needs and desires.
- 20 My inquiries and complaints were answered quickly by specialists in private banks.
- 21 I feel anxious and apprehensive during the withdrawal and deposit process via electronic payment methods.
- 22 I need to help others when using electronic payment methods (ATM).
- 23 Private banks provide a variety of credit facilities to employees whose salaries are paid by the bank.
- 24 Ease of procedures for obtaining electronic payment cards (MasterCard).
- 25 The salary is transferred to my bank account on the same date every month without delay.

Financial inclusion

The first dimension: use of banking services

- 26 I have a bank account designated for salaries, and the organization I work for transfers the salary to it monthly.
- 27 I receive some financial dues in cash from the organization I work for, but they are not transferred to my bank account.
- 28 Most workers in the private sector have a bank account.
- 29 The bank grants various loans to employees.
- 30 I can use electronic payment tools in my marketing operations daily.
- 31 I can use electronic platforms to make electronic payments.
- 32 The bank I deal with is contracted with international security companies specializing in monitoring operations — banking to prevent customers from being exposed to scams and fraud.

The second dimension: the availability of banking services

- 33** There are many branches of most banks in different places.
- 34** Automated teller machines (ATMs) are widely spread.
- 35** Most sellers prefer to use electronic payment methods.
- 36** The bank issues various cards.
- 37** We use electronic wallets provided by banks on their platforms.
- 38** I cannot withdraw the amount I want due to the unavailability of the cash denomination in the ATM, which forced me to change the number of the amount I want to receive.
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The third dimension: the ease of access to banking services

- 39** The account opening requirements are easy and quick.
- 40** The requirements for obtaining a loan are easy.
- 41** Many banking services can be accessed.
- 42** The bank I deal with seeks to enhance trust with its customers to encourage them to use its banking services.
- 43** The bank provides detailed information about any service I want and what procedures are followed to obtain it.
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The fourth dimension: costs and commissions

- 44** The bank imposes small costs and commissions on electronic banking operations to withdraw funds or transfer them to another account.
- 45** Small costs are deducted if I withdraw my salary from a bank machine belonging to a bank other than the bank from which my credit card was issued.
- 46** The bank charges low interest on the loans it provides to customers.
- 47** The bank offers good interest on the salary amount if it is not withdrawn in a large amount from the account within ten days after the salary is credited to the account.
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The fifth dimension: awareness and consumer protection

- 48** The bank carries out advertising campaigns to educate customers about depositing their money in banks and what interest they will receive from it.
- 49** The bank offers educational programs on making financial withdrawals from the ATM and transferring money to another account.
- 50** The bank provides awareness programs to customers on how to use the bank's electronic platform and benefit from all its services.
- 51** The bank provides awareness programs through media campaigns on how to avoid exposure to fraud.
- 52** The bank provides awareness programs on the usefulness of banking services in daily transactions.
- 53** The bank demonstrates the suitability of its financial services to customers' needs.
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54 The sixth dimension: quality of banking service

- The bank provides financial services that satisfy my needs and are of high quality.
- 55** The services provided by the banker are clear and transparent.
- 56** The bank informs me of the information I request when inquiring about any service.
- 57** The bank I deal with is characterized by transparency and credibility and announces its data in detail in the annual report.
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