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## The impact of e-wallets in digital finance

Mohammed H. Adnan

College of Administration and Economics, University of Anbar

[mohammed.h.adnan@uoanbar.edu.iq](mailto:mohammed.h.adnan@uoanbar.edu.iq), <https://orcid.org/0000-0001-5139-5063>

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### Corresponding author:

Name: Mohammed H. Adnan

Affiliation : College of  
Administration and Economics,  
University of Anbar

Email:

[mohammed.h.adnan@uoanbar.edu.iq](mailto:mohammed.h.adnan@uoanbar.edu.iq)

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### ABSTRACT

The research aims to measure the impact of using e-wallets in digital finance. It highlights an important tool that has attracted the attention of researchers, companies, and individuals. This tool is Zain Cash, the first e-wallet licensed by the Central Bank of Iraq. It offers various services such as money transfers, bill payments, phone credit purchases, and cash withdrawals and deposits through agents. The research followed an analytical approach by collecting real quantitative data from the Central Bank's website. The data included the number of e-wallets issued and the number of digital payments using those wallets for a six-year period from 2018 to 2023, in a time series of 72 observations. It was necessary to format the data to suit the research purposes and normalize it using the natural logarithm to achieve the best results. A simple linear regression analysis was conducted statistically using EViews 10 to verify the research hypotheses. The results concluded that e-wallets (Zain Cash) have a statistically significant impact on promoting digital finance, with a squared regression coefficient of 0.84, a slope coefficient of 0.93, and a p-value of 0.0000. These findings are significant and demonstrate the impact of e-wallets on the use and adoption of digital finance in financial transactions. The study proposes testing a larger number of e-wallets to determine their impact on digital financial inclusion.



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## ***1. Introduction***

Financial technology is a major concern for many countries around the world. Important topics have recently emerged, focusing on modern technological developments and the resulting commercial, economic, and technological growth. Global efforts and policies are directed toward digital transformation across all government, service, and private commercial sectors, in addition to the shift toward digital finance. A fundamental aspect of digital and technological transformation is the creativity and innovation of financial technology and all the tools that enable safe and fast digital financial transactions. These transformations have revolutionized the technical tools that contribute to the implementation of digital finance.

Electronic payment tools such as ATMs, credit cards, debit cards, and point-of-sale devices have evolved over decades. All of these technologies require a bank account. Large segments of Iraqi society do not have bank accounts or salaries domiciled in government banks linked to electronic payment cards. Therefore, there is a need for a digital financial transaction method that alleviates these restrictions. The need has emerged to create electronic wallets using smartphones, which require only a phone number working on the local network and a smartphone. These technologies have greatly facilitated electronic financial payments and reduced the need for paper money. These technologies are characterized by speed, ease, reduced effort and time, and lower costs. The research questions whether the increased issuance of electronic wallets enhances their use in digital financing transactions.

The research provides theoretical scientific contributions by highlighting an important type of digital financing tool that offers ease of use for a wide segment of customers. It also offers practical insights using actual data, rather than relying on surveys from earlier studies, about electronic wallets (Zain Cash) and the rise of digital financial payments in Iraq from 2018 to 2023, along with statistical tests to confirm this.

The research can be divided into several chapters: Chapter Two is a review of the literature related to electronic wallets and digital finance. Chapter Three includes a review of the theoretical framework of the research. Chapter Four includes the research methodology and data used. Chapter Five discusses the results of the applied aspect of the research. Finally, Chapter Six includes the research conclusions and recommendations.

## ***2. Literature Review***

The roots of cashless payments date back to 1997, when Coca-Cola introduced the ability to purchase Coca-Cola drinks through vending machines (Ramli & Hamzah, 2021). These initiatives paved the way for a revolution in technological and digital developments, leading to the use of mobile phones as a tool for purchasing tickets, food, and commercial transactions.

A large body of previous literature has contributed to the tools for digital transformation of financial transactions. Among the important recent topics, much research has emerged on e-wallets. A number of literature can be cited in this regard. Lonare et al., (2018) presented their study on the spread and adoption of e-wallets in India. In Bahrain, AlKubaisi & Naser, (2020) presented their study to identify the groups that influence the use of e-wallets.

The need for e-wallet usage has increased during the pandemic. Aji et al. (2020) analyzed Malaysian and Indonesian users' e-wallet usage intentions during the COVID-19 pandemic. Ojo et al. (2022) examined Malaysian users' e-wallet usage intentions during the COVID-19 pandemic. Similar research by Johan et al. (2022) examined the continued use of e-wallets in Indonesia, focusing on the benefits of e-wallets.

Esawe (2022) studied the intentions and behaviors of mobile wallet users. Similarly, Farida Bhanu Mohamed Yousoof et al. (2024) presented their research on mobile wallets and their role in financial behavior by understanding users' preferences for digital transactions.

A very important aspect that has received attention in previous literature is digital finance. Bolandhemat (2018) presented his research on digital finance innovations and methods of accessing finance using emerging technologies.

Interest in digital finance has increased during and after the global COVID-19 pandemic. Arner et al. (2020) presented their research on digital finance during the global pandemic crisis. As a result of technological developments and the significant trade openness following the pandemic, much research has shed light on digital finance. Yue et al. (2022) presented their research on the increased interest in digital finance. Kajol et al. (2022) reviewed the literature on digital financial transactions. Brika (2022) analyzed trends in digital finance and financial technology using bibliometrics. In the same context, Paulin Kamuangu (2024) presented his research on the digital transformation in finance.

More sophisticatedly, Al-Baity (2023) presented his research on the role of the artificial intelligence revolution in digital finance, a study in the Kingdom of Saudi Arabia. Cockayne & Loomis (2025) shed light on the geographies of financial technology and everyday life by reshaping financial practices and metrics in light of digital money and finance.

Recently, major challenges have emerged globally concerning the application of financial technology and the provision of digital financing, which aim to provide speed and security for government institutions, private companies, and individuals alike. Technological means have diversified, including the use of automated teller machines (ATMs), smart cards, and other technologies. None of these methods provide a home-based service for all individuals to transact digitally. Recently, the issuance of electronic wallets has emerged, enabling the effective use of digital financing. These wallets offer financial services through the use of a mobile phone, supported by modern applications, and allow accounts to be opened using only a phone number.

All the earlier studies on e-wallets that this research looked at examined what affects people's use of e-wallets by analyzing users' thoughts and intentions, as seen in the works of Lonare et al. (2018), AlKubaisi & Naser (2020), Aji et al. (2020), Ojo et al. (2022), Johan et al. (2022), Esawe (2022), and Farida Bhanu Mohamed Yousoof et al. (2024). Previous literature did not present a study on e-wallets and their role in digital finance in Iraq, nor did it use actual digital data. Previous literature relies on opinion polls. Survey tools for data collection do not provide actual data to measure the impact of e-wallet use in the digital finance revolution. This study aims to fill the existing research gap in the literature.

The current study uniquely fills a research gap not previously studied in the literature. It offers several research contributions, highlighting the application of digital finance strategies in Iraq, comparable to developed countries. The study also provides valuable contributions to researchers regarding the adoption of an efficient, quantitative measure based on real data, such as the number of e-wallets created and the number of digital financial payments using e-wallets. These variables were not previously presented in the literature, and therefore, studying them in this study provides researchers with a real contribution to measuring the impact of using e-wallets in digital finance. It paves the way for researchers to select the best variables to measure the effectiveness of implementing digital transformation in financial transactions. The study also provides effective research contributions at the results level, finding that the increase in the issuance of e-wallets significantly impacts the increase in digital finance payments using mobile phones for all individuals. The study attempts to answer the following questions:

1. Is there progress in implementing digital transformation strategies for financial transactions in Iraq?
2. Is there evidence that the use of e-wallets enhances digital financial transformation?

The research aims to answer the questions raised and provide scientific evidence that proves and achieves the research objectives and fills the research gap. It proposes the following *hypotheses*:

1. *"There is a growth in the use of e-wallets in Iraq."*
2. *"There is a statistically significant impact of the use of e-wallets on digital payments."*

### **3. Theatrical Formwork**

#### **3.1 Electronic wallet and its advantages**

An e-wallet meets the requirements of a modern wallet using a single electronic card. Users can benefit from security features not available in standard wallets. Users can disable the card in the event of theft or tampering, and it facilitates e-commerce transactions (Upadhayaya, 2012). An e-wallet is a software application used on mobile phones, tablets, and personal computers that functions as an electronic version of a physical wallet, providing an effortless and secure online payment process (Pachare, 2016).

Singh (2019) defines an e-wallet as an electronic card that enables the user to conduct transactions on various products and services, with the ability to link a personal bank account to the digital wallet to conduct purchases. It also provides secure storage of users' payment information and passwords via a smartphone application. According to Salah Uddin & Yesmin Akhi (2014) and Yathiraju & Dash (2023), using e-wallets provides several significant advantages:

1. Users can conduct financial transactions quickly, securely, and privately.
2. Make money transfers.
3. Shop online.
4. Manage an e-wallet account using a mobile phone.
5. Transfer money from one e-wallet to another without sharing personal account numbers.
6. Send and receive payments locally.
7. E-wallets are revolutionizing the way people interact with their money.
8. E-wallets are a key factor in increasing the digitization of the global economy.

#### **3.2 Factors affecting the use of electronic wallets**

According to Nag & Gilitwala, 2019 and Ambarish Salodkar et al., 2015, the following factors encourage customers to use e-wallets:

1. Availability: E-wallets should be accessible at any time.
2. Ease of Use: It is always preferable to perform activities that can be completed in less time, helping customers prioritize daily activities according to their preferences.
3. Security and Privacy: Security is the most important factor in the adoption and use of financial technology. Systems should safeguard against fraud in the electronic environment.
4. Social Influence: The social environment can influence the adoption of new financial technologies.
5. Trust: Trust influences users' intentions regarding online shopping and the use of electronic wallets and financial technology in general.
6. Cost-Efficiency: Using electronic wallets should reduce transaction costs.
7. Integration and Scalability: Systems should provide interoperability with all banking and commercial systems.

#### **3.3 Digital finance and its advantages**

Digital finance is defined as a means of payment and exchange of value in monetary terms via internet services (Daud et al., 2022). Digital finance refers to the use of digital technology by internet companies and financial institutions to expand their businesses and finances, increase equity financing, facilitate payments, and enhance information intermediation, thereby creating a financial technology model that outperforms traditional finance technologies (Y. Feng et al., 2023).

Digital finance refers to the technological aspect of the financial system, encompassing financial products and services that utilize the global telecommunications network, as well as the financial system's infrastructure. Additionally, it encompasses all mobile services and electronic applications used in finance (Lech Gąsiorkiewicz & Jan Monkiewicz, 2023). Digital finance relies on mobile digital payment systems to transform financial services from traditional to digital, breaking the geographic limitations of financial services and achieving access to financial services (S. Feng et al., 2022) (Lu et al., 2022):

1. Digital finance effectively reaches remote geographic locations and broadens the range of financial services.
2. Digital finance facilitates access to financial services.
3. Digital finance enhances financial technology by utilizing blockchain and big data technologies.
4. Digital finance lowers the expenses associated with financial services.
5. Digital finance facilitates the easing of financing constraints for companies and fosters innovation.
6. Information asymmetries between financial service providers and customers can be reduced.
7. Digital finance can improve equity investment in innovation funds.
8. Digital financial services offer self-construction or reliance on payment platform institutions and the development of a database covering the production, flow, and exchange behavior of companies through digital technologies.

### **3.4 Opportunities and Challenges of Implementing Digital Finance**

Digital finance trends present numerous opportunities and challenges, which can be summarized as follows (Kandpal & Mehrotra, 2019):

1. Digital finance companies can benefit from government policies that support digital transformation.
2. Traditional financial institutions can leverage their existing customer base.
3. Digital finance can reduce costs and increase customer numbers.
4. Improve service efficiency and expand access to meet changing needs.
5. Emerging digital finance institutions face the challenge of building trust with customers.
6. Figuring out how to market to customer needs and influence financial behavior is a major challenge.
7. Establishing a robust and responsive regulatory structure to keep pace with technological innovation is also a challenge.

## **4. Methodology & Data**

The research data was obtained from the official website of the Central Bank of Iraq, which included the number of Zain Cash e-wallets issued annually during the period from 2018 to 2023. The data was processed and converted into monthly data in a time series format spanning 72 observations. Data on cash payments using Zain Cash wallets was collected from the official website of the Central Bank of Iraq for the same period and on a monthly basis.

Zain Cash was selected as the first wallet to obtain a license from the Central Bank of Iraq and provide the largest number of available views. Data for other wallets was not available for a sufficient period to conduct the research, which covered the period from 2018 to 2023. Data on wallet issuances in 2024 was not available, so it was excluded from the time series.

The research relied on a quantitative analytical approach after data collection, and the data were prepared according to a balanced time series using E-Views 10. Then, the unit root of the time series of the dependent variable was tested before beginning the regression analysis. It became clear that the dependent variable was not constant until the first difference was taken, as shown in Table 1.

Table 1: Unit Root Test

<i>dependent variable</i>	<i>Stationary</i>	<i>Prob.</i>
<i>Number Of Zain Cash Electronic Level Payment By Mobil</i>		<i>0.9549</i>
	<i>1<sup>st</sup> deference</i>	<i>0.0001</i>

A simple linear regression test was conducted using EViews 10 at the first difference, and the results were unsatisfactory. To address this issue, the natural logarithm of the data for the two research variables was taken using Microsoft Excel to obtain appropriate normalization. A simple linear regression analysis was then conducted, given that only two main research variables were available.

Figure (1) illustrates the increasing trend in the number of e-wallets and the growth of cash payments using smart mobile devices. It also demonstrates the growing interest of Iraqi individuals in using one of the digital transformation tools for financial transactions provided by the local telecommunications network, which enhances the digital transformation of personal and household finance. It also shows that interest in creating e-wallets began in late 2019 and early 2020, coinciding with the global COVID-19 pandemic, which was accompanied by strict health measures and the suspension of many businesses. This health situation imposed the need to conduct digital financial transactions using mobile devices without the hassle of visiting banks or issuing electronic bank cards. To use an e-wallet, individuals need a mobile network with an internet connection and a local phone number, allowing them to pay for services or conduct various digital financial transactions using their mobile devices.

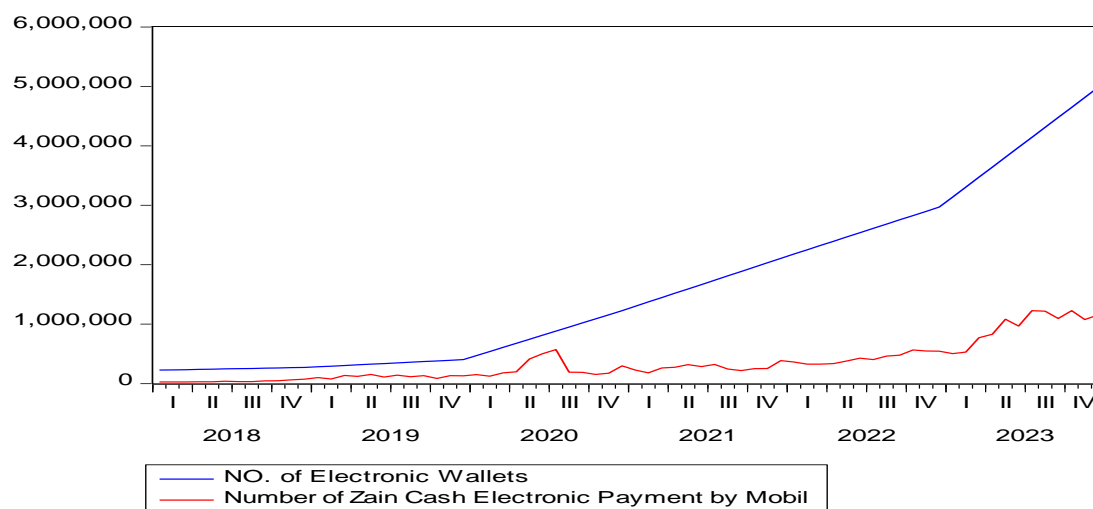


Figure 1: The behavior of increasing the number of electronic wallets and the growth of electronic payments.

Source: Research data based on the outputs of the 10 E-views programs.

The use of e-wallets was not limited to the pandemic period; it increased after its effects subsided in 2021, as evidenced by the increase in the number of e-wallets and digital financial payments using them by the end of 2023. The increase in the number of e-wallets, followed by an increase in the number of digital payments using Zain Cash, indicates a growth in the use of e-wallets (Zain Cash) in Iraq. This graphic representation of official data issued by the Central Bank confirms "the growth in the use of e-wallets for digital finance purposes." This claim is linked to the first hypothesis of the research.

Figure (2) shows the nature of the relationship between electronic wallets and the digital transformation of payments using mobile devices. It shows the consistency of the direct, linear relationship between the provision, dissemination, and use of electronic wallets for individuals and the increase in the digital transformation of payments at the local level for financial transactions.

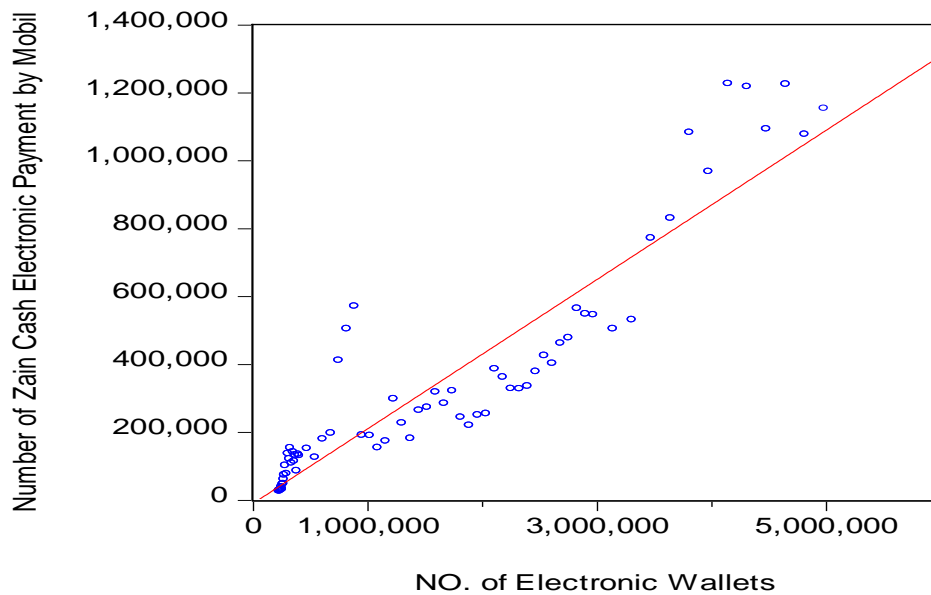


Figure (2) illustrates the relationship between the number of electronic wallets and the digital transformation in financial payments.

Source: The outputs of the E-views 10 programs.

## 5. Search Results

Table (2) shows the results of the statistical analysis of the increase in the creation of electronic wallets versus the digital transformation of local financial payments using mobile devices.

Table 2 :presents the results of the simple linear regression analysis.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.605351	0.659678	-0.917646	0.3620
NO_OF_ELECTRONIC_WALLETS	0.931775	0.047513	19.61089	0.0000
R-squared	0.846014			
F-statistic	384.5871			
Prob(F-statistic)	0.000000			

Table (2) shows the correlation square between the dependent variable (the number of Zain Cash transactions using mobile phones) and the independent variable, the number of electronic wallets in Iraq, with a coefficient of determination  $R^2$  of (0.846014), which reflects the close correlation and direct relationship between the two research variables.

Table (2) above illustrates the relationship between the two research variables, indicating that adding one e-wallet leads to a significant change in the number of digital payments made via mobile devices, with an impact factor of (0.931775). The calculated t-statistic value (19.61089), which exceeds the t-table value of (1.671), confirms the statistical test at a significance level of (0.05). This conclusion is supported by a p-value of (0.0000). This significance proves the validity of the second hypothesis of the research: "There is a significant impact of increasing the number of e-wallets on digital finance."

Researchers in the literature have mixed findings on the adoption of e-wallets. Lonare et al. (2018) found that the prevalence of e-wallets in India is much lower than expected and that the adoption of digital finance is exaggerated. This paper was followed by a study by AlKubaisi & Naser (2020), which was conducted in Bahrain and demonstrated a direct relationship between satisfaction with e-wallet use and predicted factors such as ease of use, compatibility, usefulness, and security, with statistical significance.

The results of a study (Aji et al., 2020) comparing Malaysia and Indonesia, with different levels of government support in both countries, revealed the impact of the COVID-19 pandemic on customers' use of e-wallets. Similar findings were confirmed by a study (Ojo et al., 2022), which indicated that the interaction effects and health risks of COVID-19 impacted the willingness to use e-wallets in Malaysia.

Farida Bhanu Mohamed Yousoof et al., 2024, confirms the vital role of government programs and policies in promoting the use of e-wallets to transition to digital finance for mobile phone users in Malaysia.

The current research presents significant findings in demonstrating the impact of the establishment of electronic wallets (Zain Cash Iraq) on the digital transformation of local payments. The current research is unique in its quantitative measurement and statistical analysis, confirming the effective impact of the establishment of electronic wallets by telecommunications companies and the provision of government support for digital transactions for smartphone users without the need to open bank accounts. The research methodology and results differ from previous literature that relied on survey data. The research results provide more accurate real and statistical evidence on the role of electronic wallets in promoting digital finance.

## **6. Consolation**

The research faced several limitations, most notably the lack of data on other types of wallets, such as Asia Hawala, FastPay, and NasWallet. This was the most prominent ramification that necessitated the adoption of a simple linear regression model due to the lack of sufficient data.

Studying e-wallets is an urgent necessity, given the lack of published research papers on them in Iraq, unlike electronic payment cards. The COVID-19 pandemic at the beginning of 2020 marked the beginning of the need to use e-wallets, despite the issuance of these wallets by Zain Cash in 2017. The continued use of these wallets after the pandemic and the growth in digital financial transactions, with numbers many times greater than those issued during the pandemic, indicate the interest of some segments of society in dealing with Zain Cash. They prefer it over other financial transactions, as it does not expose them to the financial risks associated with electronic cards linked to a bank account.

The research attempts to answer the first question through Figure 1, presented previously, which illustrates the growth in the use of e-wallets in daily financial transactions, the multi-fold increase in the number of e-wallets, and the growth in financial transactions using these wallets.

E-wallets have proven their effective role in stimulating and developing digital finance by promoting digital payments through the use of e-wallets. They enable all individuals with mobile devices to create and receive e-wallets at home, using a local phone number, without the need to conduct direct banking transactions or visit branches or offices. All of these facilities provide evidence demonstrating the effectiveness of e-wallets in digital finance, both practically and statistically, as shown in the results of Table 2, which includes a simple linear regression analysis.

The study suggests conducting further research on different types of e-wallets and measuring their contribution to digital financial inclusion.

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**Competing Interests**

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