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**Article**

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## The quality of e-payment services offered by mobile companies: the Syrian evidence

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### ABSTRACT

The recent introductory of e-payment services in Syria and the overwhelming interest of such new services call for thorough investigation of their quality and venues for improvement to unleash their full potential. This study investigates the quality of e-payment services offered by mobile network operators in Syria by adopting the E-SERVQUAL metric based on four dimensions: ease of use, reliability, security and privacy, and responsiveness. This study presents the responses of 133 users of these services in Syria from October to December 2023. The results indicate that e-payment services were of high quality in terms of reliability, security and privacy, and responsiveness dimensions. However, they are of lower quality in terms of ease of use. It is recommended that mobile companies increase the flexibility of e-payment services by widening the top-up options and offering more payment categories as well as relaxing the ceiling set for any single e-payment transaction. These companies were also encouraged to increase the number of kiosk machines to credit customer balances and improve the distribution of these machines into more selective locations. Furthermore, mobile companies may increase their share in the e-payment market by offering rewards and cash discounts for transactions conducted through their e-payment platforms.

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## 1. Introduction

Syria is a low-income country with an average per capita income of 537.2 US dollars in 2020 (World Bank, 2023). Agriculture is the leading sector, with agricultural land constituting 75.8 percent of the land area and contributing approximately 36.6 percent to the Syrian GDP in 2020 (World Bank, 2023). The Syrian economy is mostly cash-based, with a society that prefers to deal with cash and has little experience with banks, cards, and ATMs. Syria had a large, underbanked population with a population-per-branch ratio of 41,600 in 2010 (Badra, 2015), which has even deteriorated due to war conditions to reach 51,355 in 2020 (Central Bank of Syria, 2024). According to the latest published figures on financial inclusion, the percentage of the population over 15 years with financial institution accounts was 23.25 in 2011, based on the Global Findex Database of the World Bank (2021).

The destructive war in Syria has devastating consequences on economic and social conditions. That is, there was a significant decline in economic activities, with the per capita GDP deteriorating from 2014 to 2020 by approximately 67% (Central Bureau of Statistics, 2022). Moreover, according to the Syrian Bureau of Statistics, inflation rates exceeded two digits in 2020 and 2021 at 120.86% and 118.84%, respectively. Furthermore, the percentage of Syrians who live below the poverty line reached 90 percent (based on ICRC, Anadolu Ajansi, 2023). Thus, little income is left for savings or investment, with the majority spent on essential products and services.

Mobile money systems perform very well in countries with weak bank networks and provide many advantages especially for people living in rural areas. First, it opens venues for advancing financial inclusion, particularly gender inclusivity (Akter et al., 2021; Bold et al., 2012; Evans, 2018; Ghosh, 2016; Ishioro,

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2023; Sinha et al., 2024). Second, it saves time and offers a safer alternative to carrying cash, especially in conflict areas (Aron, 2017). Third, it provides an appealing alternative to bank accounts, especially for unbanked individuals at lower costs (Donovan, 2012; Lutfi et al., 2021). Forth, e-payment systems discourage bribery and corruption, tax evasion, and under invoicing and safe in the huge costs of printing new notes in hyper-inflation countries (Yaokumah et al., 2017). Alnafrah and Mouselli (2020) stated that developing financial services in Syria is a decisive factor in building a knowledge-based economy and society in post-war Syria.

However, many prerequisites exist for mobile money systems to constitute a real alternative to bank services. First, supportive regulations are available that encourage the adoption of e-payment services and sometimes force the shift toward a cashless society. Second, technology literacy is essential, especially among older people, to enable them to use mobile money solutions. However, inflation that caused a high increase in smartphone prices is a significant barrier to the use of e-payment services offered by mobile companies. Third, the availability of electricity and stable internet connectivity is necessary for good service quality. Insufficient mobile network coverage, especially in rural areas, is a real impediment. However, all mobile money platforms provide services through Unstructured Supplementary Service Data (USSD), which does not require the Internet.

There are three business models for mobile money providers: mobile-operator-led, bank-led, and collaborative (Donovan, 2012). E-payment services offered by mobile companies are not a niche method of payment, especially with the appearance of many new Fintech solutions such as M-wallet (Kumar et al., 2019). However, e-payment services through mobile companies are pivotal in developing countries with large unbanked or underbanked populations (Hamdi, 2011). Thus, this study aims to evaluate the quality of e-payment services offered by mobile companies in Syria.

The importance of this study is fourfold. First, the fierce competition between banks on the one hand and between banks and mobile companies on the other hand makes investigating the quality of e-payment services provided by mobile companies very crucial. Second, the good share of mobile network companies in the e-payment markets deserves careful examination of the strengths and weaknesses of e-payment services provided by mobile network operators. Third, enhancing the quality of e-payment services will contribute to higher levels of well-being and financial inclusion in Syria. Finally, this study investigated the quality of e-payment services in the special conditions of the war-torn country of Syria. Improving the quality of such services will enhance the Syrian economy's performance and speed up the post-war recovery.

This study was divided into five sections. In section two, the digital payment ecosystem in Syria was described. Section three reviewed the theoretical background and developed research hypotheses. Then, section four presented the research methodology. Next, the main empirical findings were revealed in section five, and section six concluded with practical implications and recommendations.

## 2. Digital payment services in Syria

Syria has two mobile network operators, Syriatel and MTN, with a third mobile operator licensed in early 2022 and yet to operate. Those two mobile companies offered their e-payment services of Syriatel cash and MTN pay, respectively, in May 2021. Customers purchase credit from on-site shops and public mobile phone top-up kiosk machines and use this credit to pay bills, purchase products and services, and top-up their mobile phone credit.

Although only 7.39 percent of the Syrian population had fixed broadband subscriptions (World Bank, 2023), 80 percent had mobile phone subscriptions. This represented an opportunity for mobile companies to integrate mobile users into their digital payment system, especially those who live in rural areas. Moreover, the digital payment industry flourished with six companies offering e-payment solutions ranging from operating Points-of-sales (POS) to offering e-payment platforms.

The digital payment ecosystem in Syria has undergone a paradigm shift with the introduction of mobile apps by Syrian private and public banks. This move was encouraged by the Central Bank of Syria (CBS), which took refuge in these apps to reduce the demand for banknotes, particularly with two-digit inflation that required additional circulating cash. Syrian banks were also keen to offer e-payment services as part of their plans to redesign their services to overcome the adverse consequences of sanctions

(Laham et al., 2023). However, unlike other countries, CBS did not impose a national exclusive platform for e-payment in Syria, as it also allowed mobile companies to offer e-payment services. Nevertheless, unlike other developing countries, due to war conditions and foreign exchange controls, the Syrian market remains closed to giant global hi-tech companies, such as Google's pay app.

The Syrian Electronic Payment Company (SEP) was established in March 2012 to prepare the necessary infrastructure for e-payment services and coordinate between public service providers, banks, mobile companies, and customers. However, SEP remained dysfunctional and hindered by long delays until the Covid-19 pandemic hit the world. A major advantage of this pandemic for many developing countries, particularly Syria, is that it accelerates digitalization in many domains, such as health, education (Mouselli et al., 2021), and business (Akkad & Mouselli, 2023). Alnafrah et al. (2021) predict that one of the main beneficiaries of such acceleration, which supports all other domains, is the activation of the Syrian digital payment system. The actual start of SEP in 2020 represents the cornerstone of the e-payment ecosystem in Syria.

According to SEP, the share of Syriatel Cash and MTN Pay from total e-payments made to public entities was 5.05 percent and 1.79 percent, respectively, in 2021. However, their share increased to 22.38 percent and 9.81 percent in 2022, representing almost one-third of all e-payments gone to public entities (Syrian Electronic Payment Company (SEP),, 2022). These figures increased to 34.06 percent and 11.09 percent, respectively, for the first 8 months of 2023 (Syrian Electronic Payment Company (SEP),, 2023), meaning that almost half of all e-payments conducted in Syria were done via mobile companies.

Enab Baladi (2024) has recently surveyed residents of the neighborhoods of Lattakia regarding the obstacles that encounter them while using mobile e-payment services. They highlighted that network overload, poor internet coverage as well as costly smart phones were major challenges that hinder them while paying bills using e-payment services.

The UN e-government knowledgebase survey conducted in 2022 indicated that Syria was ranked 156<sup>th</sup> globally out of a total of 193 countries according to e-government development index while it was ranked 133<sup>th</sup> in 2010 (United Nations, 2022), which suggested a decline in the electronic services over the war period. To combat this, recent regulations issued by the Syrian government attempted to encourage e-government policies through supporting e-payment and cashless transactions. Paying the bills of many public entity services, such as water and telecommunications, is now offered electronically with very limited cash options. For example, passport issuance fees have to be paid only electronically. In addition, the government indicated that tuition fees for higher education students at public and private universities should be paid "exclusively" through bank accounts before bank transfers or direct cash deposit into the university or educational institution's account were permitted (Fansa, 2023). According to the Syrian Ministry of Communication and Technology (2023), the total value of e-payment transactions from customer to business reached SP3.569 trillion by the end of the third quarter of 2023.

### 3. Theoretical background and hypothesis development

Electronic payment (e-payment) is a service that can be defined as "the transfer of an electronic value of payment from a payer to a payee through an e-payment mechanism" (Kim et al., 2010). Scientific studies on using e-payment services can be divided into two main streams: one concerned with the intention to use the new e-service and the second related to the quality of the e-payment services itself.

Many theories explain the intention to use new technologies such as e-payment services. The pioneering theory of Planned Behavior (TPB) proposed by Ajzen (1991) was followed by the Technology Acceptance Model (TAM) proposed by Davis et al. (1989). This model was later complemented by the Unified Theory of Acceptance and Use of Technology (UTAUT) of Venkatesh et al. (2003). Venkatesh et al. (2012) developed UTAUT into UTAUT2 by adding factors that explained technology use and acceptance, such as price value, habit, and hedonic motivation. Rogers (2003) proposed Innovation Diffusion Theory (IDT), which integrated cultural and societal factors into technology diffusion.

Parasuraman et al. (1985) advocated that customer expectations gap could be used to measure service quality. Parasuraman et al. (1988) suggested SERVQUAL as a metric for service quality that covered five dimensions for which the expectations gap should be measured: reliability, responsiveness, assurance, empathy, and tangibility. Modifications to SERVQUAL to accommodate cultural

aspects for the insurance sector were also introduced and renamed SERVQUAL as GIQUAL (Tsoukatos & Rand, 2006, 2007) while HESQUAL for the higher education sector (Teeroovengadum et al., 2016) and HEALTHQUAL was used for the measuring the quality of health services in Syria (Allahham et al., 2022).

When various internet and mobile-based services became popular, this metric was subject to many modifications. Models like e-SQ and e-SERVQUAL were proposed to measure the quality of e-services (e.g., Gefen, 2002; Ho & Lee, 2007; Loiacono et al., 2002; Parasuraman et al., 2005, Wu et al., 2015; Zeithaml et al., 2000). For the quality of services provided through websites, the WebQual metric was also proposed (Barnes & Vidgen, 2002; Loiacono et al., 2002). Moreover, SITEQUAL was advanced to measure the quality of internet shopping sites (Yoo & Donthu, 2001), eTailQ (Wolfinbarger & Gilly, 2003) was suggested to measure online retail service quality, and eTransQual to measure the quality of e-transactions (Bauer et al., 2006).

As a result, an E-SERVQUAL metric was proposed to measure the quality of e-payment services, which consists of the following four dimensions.

### **3.1. Ease of use**

*Ease of use:* it was defined as the level of effort required while using any technology service, such as mobile commerce or mobile payment services (Liébana-Cabanillas et al., 2020). Mobile payment services use advanced technology, and users perceive them as complex and challenging to operate, which develops stress and anxiety while doing transactions (Sharma et al., 2018). Perceived ease of use was a significant determinant of the actual use of digital payments (Masoud & AbuTaqa, 2017; Nguyen & Nguyen, 2022; Teoh et al., 2013). However, others found it an insignificant influencer of the actual use of e-payments (Ananda et al., 2020; Okonkwo et al., 2023; Sharma et al., 2017). Hence, it was hypothesized that the level of easiness of using e-payment services offered by mobile companies is as follows:

H1. Respondents perceive e-payment services offered by Syrian mobile companies as easy to use.

### **3.2. Reliability**

Various research on electronic service quality revealed that reliability is one of the most critical dimensions (Gupta & Bansal, 2012; Han & Beak, 2004; Jun & Cai, 2001; Khan et al., 2009; Salarzehi et al., 2012; Santouridis et al., 2009). Service reliability is vital for any new service deployment, mainly if conducted online. During the users' interaction with the e-payment system, the user issues multiple tasks (or requests) at different time points. The user-perceived service reliability was the probability that all tasks in the user's session were completed (Wang & Trivedi, 2009). Neuman and Medvinsky (1998) opined that the reliability of the e-payment operation system means the continuous availability of the service without breaking down at any time. Kundu and Datta (2014) found that timely rectification of errors with the least intervention from customers was the primary influencer of reliability of e-payment service in the view of Indian online shoppers. This study investigated the following hypothesis on the reliability of e-payment services offered by Syrian mobile operators:

H2. Respondents perceive e-payment services offered by Syrian mobile companies as reliable

### **3.3. Security and privacy**

*Security and privacy:* electronic transactions are often perceived as riskier than face-to-face transactions due to the complicated hacking activities. Hence, security is a crucial determinant of the quality of e-payment services (Bauer et al., 2005; Gupta & Bansal, 2012; Khan et al., 2009; Siu & Mou, 2005; Szymanski & Hise, 2000). Moreover, privacy is one of the most critical determinants of the quality of online services (Akinci et al., 2010; Gupta & Bansal, 2012; Khan et al., 2009; Salarzehi et al., 2012). Hassan et al. (2020) reviewed the major security issues related to using e-payments and how to make them

secure. While security was found to be a significant determinant of the actual use of e-payments (Humbani & Wiese, 2018; Masoud & AbuTaqa, 2017), others found it insignificant (Rootman & Krüger, 2020; Teoh et al., 2013). This study examined the following hypothesis regarding the security and privacy of e-payment services offered by Syrian mobile operators:

H3. Respondents perceive e-payment services offered by Syrian mobile companies as secure and private.

### **3.4. Responsiveness**

It is one of the five dimensions suggested by Parasuraman et al. (1988) in their SERVQUAL metric and later adopted by many researchers (e.g., Bauer et al., 2006; Lee & Lin, 2005; Li et al., 2002). Alhammadi and Tariq (2020) examined the quality of e-payment services in the UAE and found that respondents appreciate the high speed in solving problems related to e-payments. Kar (2021) found that responsiveness is essential in increasing users' satisfaction with mobile payment services. In this study, the level of responsiveness of e-payment services offered by mobile companies was as follows:

H4. Respondents perceive e-payment services offered by Syrian mobile companies as characterized by high responsiveness.

Previous studies investigated variations in the realization of e-payment service quality according to demographics (Yaokumah et al., 2017). Ramayanti et al. (2024) has reviewed the literature on the role of demographics, among other factors, in the intention and actual use of digital payments. Hence, we examine if there were any significant differences in the four dimensions mentioned above according to age, sex, income level, and educational attainment. Thus, the fifth hypothesis was:

H5. There are significant differences in service quality dimensions according to demographic characteristics, income level, and educational attainment.

## **4. Research methodology**

This study was conducted based on a survey from October to December 2023 to uncover the quality of e-payment services offered by mobile companies in Syria. This survey was considered a situation analysis that eased the process of data collection and analysis (Ferrell & Hartline, 2008). The questionnaire survey was designed to be assessed on a Likert scale with a five-point response format ranging from 1 (strongly disagree) to 5 (strongly agree).

The survey started with an introduction informing participants about the research's purpose and containing demographic, education, and income-related questions. Then, a section was dedicated to the four investigated service quality dimensions. That was, four items to measure ease-to-use, four items to capture reliability, five items to measure security and privacy, and five items to capture reliability.

A non-probability convenience sampling strategy was adopted to have more participants in the survey and widen the representation of our sample (Gómez & Mouselli, 2018). The survey was prepared on Google Forms and distributed electronically through social media. This study was approved by the Faculty of Business Administration Research Ethics Committee (approval no. AIU5524). Informed consent of the respondents was sought and they were all given voluntary opportunity to participate in this study. The sample consists of 133 respondents who completed the survey electronically. The collected data was analyzed using version 27 of the Statistical Package Software for Social Sciences (SPSS). An exploratory factor analysis and reliability test was performed on each e-payment quality dimension.

The demographic distribution of respondents indicated that females dominated the sample with a percentage of 76.7, while men constituted only 23.3 percent (Table 1). In addition, the majority of the sample centers were in the age category of 20 to 29 years, with 69.2 percent, followed by the age category of 30 to 39 years, constituting 16.5 percent. This indicated that the sample was skewed towards the young to middle-aged category. Expectedly, the monthly income reflected such skewness, with the middle-income category manifested as the dominant category of more than half a million to one million. This also agreed with the educational attainment, suggesting that most of the sample were university bachelor holders, representing approximately half of our respondents.

**Table 1.** Respondents' demographical characteristics (created by the authors).

Characteristic	Respondents number	Percentage (%)
<i>Gender</i>	133	100
Female	102	76.7
Male	31	23.3
<i>Age category</i>	133	100
Less than 20	3	2.3
20–29	92	69.2
30–39	22	16.5
40–49	6	4.5
50–59	7	5.3
60 and above	3	2.3
<i>Monthly Income</i>	133	100
Less than SP100,000	16	12
SP100,000-SP500,000	26	19.5
SP500,001-SP1 million	61	45.9
Over SP1 million	30	22.6
<i>Education level</i>	133	100
Technical degree	1	0.8
Bachelorette	19	14.3
University Bachelor	67	50.4
Master	29	21.8
PhD	8	6
Others	9	6.8

**Table 2.** Exploratory factor analysis and reliability test (created by the authors).

Code	Item	Factor loadings				Variance		Cronbach's Alpha
		F1	F2	F3	F4	Explained	Eigenvalues	
<i>Ease of use</i>								
E1	E-payment service through mobile companies is fast.	0.778				48.368	1.935	0.641
E2	I can always pay quickly through mobile companies.	0.624						
E3	I find e-payment through mobile companies easy.	0.553						
E4	I find e-payment through mobile companies flexible.	0.797						
<i>Reliability</i>								
R1	I highly trust e-payment through mobile companies.	0.86				57.068	2.283	0.738
R2	E-payment through mobile companies is reliable.	0.817						
R3	I can perform my e-payment from the first time.	0.682						
R4	E-payment through mobile companies is always available and functional.	0.64						
<i>Security &amp; Privacy</i>								
S1	E-payment through mobile companies does not allow others to penetrate my account.	0.719				54.86	2.743	0.793
S2	E-payment through mobile companies is secure.	0.739						
S3	E-payment through mobile companies protects information sent by me.	0.71						
S4	E-payment through mobile companies insures my privacy.	0.769						
S5	E-payments through mobile companies do not share my personal data.	0.764						
<i>Responsiveness</i>								
P1	E-payment through mobile companies is available 24/7	0.799				54.937	2.747	0.793
P2	The response to e-payments through mobile companies is prompt.	0.700						
P3	Assistance is available instantly in case of a problem.	0.724						
P4	Mobile companies answer queries quickly regarding e-payment services.	0.698						
P5	The customer service team in mobile companies is empathetic in responding to complaints on e-payment services.	0.779						

## 5. Results

The results of conducting an exploratory factor analysis to discover the dimensionality of the questionnaire items were presented in Table 2. The varimax rotated principal axis factorization was used and report Eigenvalues and factor loadings for each statement alone with the variance explained and Cronbach's Alpha for the overall dimension. It was noticed that all reported Eigenvalues exceeded the minimum of 1 and that factor loadings were over 0.3, as Creswell (2020) suggested. It also used a

**Table 3.** Respondents' view regarding ease of use (created by the authors).

Statement code	Average	Standard Deviation	T-statistics	P-value
E1	2.98	1.007	-0.172	0.864
E2	3.14	0.877	1.779	0.077
E3	3.41	0.896	5.223	<0.001
E4	2.94	0.998	-0.695	0.488
Overall	3.12	1.022	2.046	0.043

**Table 4.** Respondents' view regarding reliability (created by the authors).

Statement	Average	Standard Deviation	T-statistics	P-value
R1	3.55	0.857	7.387	<0.001
R2	3.55	0.812	7.800	<0.001
R3	3.40	0.825	5.569	<0.001
R4	3.17	0.973	2.049	0.042
Overall	3.42	0.650	7.399	<0.001

**Table 5.** Respondents' view regarding security and privacy (created by the authors).

Statement	Average	Standard Deviation	T-statistics	P-value
S1	3.27	0.906	3.447	<0.001
S2	3.51	0.910	6.482	<0.001
S3	3.50	0.926	6.272	<0.001
S4	3.41	0.970	4.830	<0.001
S5	3.45	0.857	6.071	<0.001
Overall	3.43	0.677	7.306	<0.001

minimum of four items for each factor, which fulfilled the minimum criteria suggested by Brown (2015) of a minimum of three items per factor.

The results of Cronbach's Alpha for all factors exceeded the threshold of 60 percent suggested by DeVellis and Thorpe (2021). In particular, three of the four e-payment service quality dimensions are above 70 percent while only easy to use scored 0.641. Thus, the level of internal consistency for all examined factors was acceptable.

**Table 3** presents the respondents' views on the ease of use of dimension statements. It indicated that respondents find e-payment services through mobile companies easy to use, with an average of 3.41, which was significantly different from the average value of 3 at a 1 percent significance level. However, they indicated that they not necessarily pay quicker when using these services, with an average of 3.14, but statistically insignificant at a 5 percent significance level. This could be attributed to poor internet coverage, especially in villages, which forced users to try many times and change locations to have the payment go through (Enab Baladi, 2024).

Respondents seemed neutral on the speed and flexibility of e-payment services, with averages that were just below 3. Customers may perceive mobile e-payment services to be slow because top ups require personal visits to on-site shops or kiosks, which are still not widely available or adequately distributed. In addition, the reported inflexibility in e-payment services may be due to the limited top-up options and categories and to the ceiling set for a single e-payment, especially if the transaction requires a payment that exceeds the set limit. The overall average of the dimension was 3.12, which was significant at a 5 percent significance level. Hence, it was possible to accept the first hypothesis, *H1*, that e-payment services offered by Syrian mobile companies were easy to use.

The results of the second dimension, reliability, are presented in **Table 4**. It can be underlined that respondents confirmed that e-payment services through mobile companies were trustful and reliable, as indicated by the averages and significance of statements R1 and R2. Respondents also confirmed that e-payments were executed for the first time, as highlighted in statement R3. However, it seems that they were less certain of the availability and functionality of the e-payment services, though it is significant at a 5 percent level. This could be due to electricity cuts or maintenance work that halts the service for specific times during the day. However, the overall average of the dimension was 3.42, significantly different from three at a 1 percent significance level. Thus, it was possible to accept the second hypothesis, *H2*, that e-payment services offered by Syrian mobile companies were perceived as reliable.

**Table 5** illustrates the results of the third dimension, security and privacy. Respondents stated that e-payment services through mobile companies were secure (S2) and protected their information (S3).

**Table 6.** Respondents' view regarding responsiveness (created by the authors).

Statement	Average	Standard Deviation	T-statistics	P-value
P1	3.50	0.893	6.409	<0.001
P2	3.44	0.882	5.702	<0.001
P3	3.35	0.879	4.536	<0.001
P4	3.24	0.897	3.092	0.002
P5	3.58	0.855	7.812	<0.001
Overall	3.42	0.652	7.419	<0.001

**Table 7.** Anova test for equality of means according to demographical characteristics (created by the authors).

Dimension	F-statistic	P-value
<i>Age</i>		
Easy of use	0.334	0.892
Reliability	0.109	0.990
Security and Privacy	0.330	0.894
Responsiveness	0.899	0.484
<i>Sex</i>		
Easy of use	6.269	0.014**
Reliability	11.708	<0.001***
Security and Privacy	2.888	0.011**
Responsiveness	5.302	0.023**
<i>Monthly Income</i>		
Easy of use	0.224	0.880
Reliability	0.114	0.952
Security and Privacy	1.051	0.372
Responsiveness	2.092	0.104
<i>Education level</i>		
Easy of use	2.053	0.076*
Reliability	0.770	0.573
Security and Privacy	1.232	0.298
Responsiveness	1.540	0.182

Note:\*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% respectively.

Respondents also were sure that e-payment services could not be penetrated (S2), ensure privacy (S4), and not share their information (S5). All these statements had significant averages at a 1 percent significance level. Al-Allaf (2024) confirmed this finding when she interviewed the CEO of SEP who stressed that e-payment transactions are totally safe and secured because no personal data is transferred. In addition, this dimension had an average overall score of 3.43, significantly different from 3, indicating that respondents were happy with the level of security and privacy provided by mobile companies for e-payment service users. This could be due to the multiple layers of authentication to verify users adapted by mobile network operators. Therefore, it was possible to accept the third hypothesis, *H3*, that e-payment services offered by Syrian mobile companies were perceived as secure and private.

The results of the fourth dimension, responsiveness, are illustrated in Table 6. The highest score statement regarding this dimension was related to the empathy of customer service when responding to complaints regarding the e-payment services (P5) with an average of 3.58, which was significant at 1 percent significance. The lowest score was reported for the speed in answering queries quickly regarding e-payment services (P4), though it was also significantly above three. The averages of other statements were all significantly above three, with an overall average of 3.42, significantly different from three at a one percent significance level. Hence, it was possible to accept the fourth hypothesis, *H4*, that e-payment services offered by Syrian mobile companies were considered as high responsiveness.

To examine if there were any significant differences in the four dimensions of e-payment service quality mentioned above according to age, sex, level of income, and educational attainment, Anova test was conducted for the equality of means (Table 7).

Results indicated insignificant differences between age and monthly income groups regarding the four dimensions of e-payment service quality. This could be due to the concentration of respondents in a certain age group, i.e., 20-29 years, and in a certain monthly income group, i.e., SP500,001-SP1 million. Expectedly, the ease of using e-payment services was positively related to educational level with an F-statistic of 2.053, which is statistically significant at a 10 percent significance level. This result could be explained by the fact that highly educated customers would have better ICT skills. However, there were

**Table 8.** The means of e-payment service quality dimensions according to sex.

Dimension	Female	Male
Easy of use	3.1936	2.8629
Reliability	3.5196	3.0806
Security and Privacy	3.5098	3.1613
Responsiveness	3.4902	3.1871

insignificant differences between education-level groups regarding reliability, security and privacy, and responsiveness.

Regarding sex, females stated that e-payment services were easier to use, more reliable, had higher security and privacy, and were more responsive than males. Hence, the results regarding the variations in e-payment service quality according to sex indicate a rejection of H5. This result confirmed the gender inclusivity of e-payment service suggested by Bold et al. (2012) and that females find e-payment services a reliable substitute for costly and exhausting traditional payments. In addition, results indicate that female customers perceived mobile e-payment services more secured than males. This finding is consistent with Yaokumah et al. (2017) for Ghanaian customers who attribute this result to males' tendency to explore and identify vulnerabilities in systems more than females. Table 8 further detailed how the investigated four dimensions of e-payment service quality vary according to sex.

## 6. Conclusions

E-payment services have become an indispensable component of the world economy that saves customers time and effort and enables them to conduct remote financial transactions. Recent advancements, such as M-wallets, offer customers complete control over their financial accounts while providing various options to suit their requirements. Higher quality e-payment services will pave the way for further developments that could reshape the Syrian digital payment ecosystem and economy.

In order to investigate the quality of e-payment services offered by mobile network operators in Syria, the E-SERVQUAL metric was adopted based on four dimensions: ease of use, reliability, security and privacy, and responsiveness. It collected the responses of 133 users of e-payment services offered by mobile companies in Syria from October to December 2023. It was found that these services were perceived of high quality in terms of reliability, security and privacy, and responsiveness dimensions. It seems that mobile e-payment services compensated for carrying bags of cash or using bank cards that Syrians were unfamiliar with especially that e-payments have higher ceilings than daily ATMs' withdrawals. Moreover, even though e-payment services offered by mobile companies were generally perceived as easy to use, there were several shortcomings related to their flexibility and the time required to top up customers' accounts.

The findings of this study should be beneficial for mobile companies. It is strongly advised to that mobile companies increase the flexibility of e-payment services by widening the top-up options, offering more payment categories, and relaxing the ceiling set for any single e-payment transaction. They are also encouraged to increase the number of kiosk machines to credit customer balances and improve the distribution of these machines into more selective locations. Moreover, mobile companies may increase their share in the e-payment market by offering rewards and cash discounts for transactions through their e-payment platforms. Furthermore, mobile companies are encouraged to improve the availability and functionality of e-payment services through recovery systems that ensure the continuity of e-payment services around the day. Solving these issues will improve users' experience and inspire others to use e-payment services.

On the theoretical side, this study contributes to the research on service quality by exploring the quality of e-payment services in a war-torn country of Syria. Moving to e-payment services seem to be an ideal mitigation strategy to circumvent challenges posed by war conditions. Hyper-inflation, costly transportation and the widespread e-business aligned the interests for governments, companies, and individuals towards speedy and efficient e-payment system. In addition, it illustrates that the e-payment services provided by mobile companies can be seen as a reasonable alternative to banking e-payment services for the largely unbanked population in post-war countries.

This study has several limitations. First, it did not consider the mediating role of recent digital transformation regulations and e-service cost on the perceived quality of e-payment services. Second, given that banks also offer e-payment services, comparing the quality of e-payment services offered by mobile network operators to those provided by banks will be valuable. Third, this study made no distinction between e-payment users with bank accounts and unbanked users. Forth, this study employed e-SERVQUAL metric with four dimensions to measure the quality of e-payment services. Using additional dimensions of e-service quality such as enjoyment and interactivity as well as distinguishing between respondents that reside in rural areas and urban areas may represent possible venues for future research.

## Authorship contributions statement

Batoul Alsayed Suliman: Conceptualization, Methodology, Data collection. Sulaiman Mouselli: Data analysis, Writing-Original draft preparation, Validation, Reviewing and Editing.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## Data availability statement

The data that support the findings of this study are available from the corresponding author, SM, upon reasonable request.

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