




“Payment and settlement system in Saudi Arabia: A multidimensional study”

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PAYMENT AND SETTLEMENT SYSTEM IN SAUDI ARABIA: A MULTIDIMENSIONAL STUDY

Abstract

A country's payment and settlement system refers to payment means or instruments, procedures, supportive and technical services of clearance, fund transfer, and final settlement. To study the various dimensions of the payment and settlement system, an online survey was administered and 240 responses were collected from Saudi and non-Saudi nationals, while secondary data were obtained from the SAMA (Saudi Arabian Monetary Authority) website. Index numbers, percentages, ranks, Average Trend Growth Rate, and payment weights means are applied to get the mutual growth trend, average growth, and contribution of specific means in payment and settlement in Saudi Arabia. There are negative trends in the traditional payment and settlement system in Saudi Arabia. Based on the value (amount) of transactions, Mada (Debit card) and E-payment (SADAD – a payment system, and SARIE – Saudi Arabian Riyal Interbank Express) are the most significant contributors to online payment (51.63%), while POS (point of sale) is the fastest-growing (158%) means of payment and settlement in Saudi Arabia. The means of traditional payment and settlement negligibly (< 1%) contribute to the payment and settlement system in Saudi Arabia. The analysis of responses reveals that payment and settlement users were unsatisfied with the various dimensions of security (39%) and traceability (35%) of the payment and settlement systems in Saudi Arabia. All dimensions of security and traceability must be considered to increase the degree of satisfaction with payments and, in particular, settlements in Saudi Arabia.

Keywords

traditional payment, e-payment, user satisfaction, online transactions, Saudi Arabia

JEL Classification

G21, C12, C43

INTRODUCTION

The payment and settlement system of a nation refers to that entire system that includes payment means or instruments, procedures, supportive and technical services of clearance, fund transfer, final settlement, and related common rules and regulations to facilitate payment to the beneficiary. The payment and settlement system enables smooth payment, obstacle-free clearance, or settlement between the payer and the beneficiary. Currently, the payment and settlement system is very advanced and includes technical or online and traditional modes of payment and settlement. Modern or online payment and settlement systems consider a credit card, debit card, smart card, e-wallet, and m-banking. While clearing commercial and personal cheques and interbank clearing of commercial cheques are treated as traditional payment and settlement mean. The payment and settlement system accelerates the growth and development of the nation or economy by providing an easier and cheaper facility for payment and settlement. In the present era of technology, the payment and settlement of individuals and business organizations are executed online by some applications supported by dedicated payment portals. Nowadays, all countries imagine a cashless society and electronic business payment settlements to make transactions easier, cheaper, and more convenient.

Saudi Arabia's financial services and facilities are still in the early stages of development and encounter certain challenges in smooth payments. In Saudi Arabia, there are various means of payments and settlements available, and the government emphasizes payment and settlement electronically. Ministry of Finance (MoF), the Saudi Arabian Monetary Agency (SAMA) governs the payment and settlement system in Saudi Arabia. Saudi government allows Moyasar, Payfort, Paytabs, and Hyperpay electronic portals to make payments easily and immediately (Payments channels, 2022). Saudi Arabian government provides financial services by electronic methods, i.e. SADAD, SARIE (Saudi Arabian Riyal Interbank Express) system, and Mada (Debit card). SADAD was launched by the SAMA in 2004 and provides the services of bill payment, i.e. water, electricity, telecommunication, and government payments and fees. Nowadays, SADAD provides payment facilities in various sectors and intends to solutions for all payments in the future. SARIE was designed in 1997 to provide faster fund transfer services from one bank to another bank based on the concept of RTGS (real-time gross settlement) in Saudi Arabia. A Saudi payment network (SPAN) was established in 1990 in Saudi Arabia and is increasing year by year. Mada is a debit card that directly links to the bank account of the customers and allows withdrawals from the ATMs scattered in Saudi Arabia. Debit cards also allow customers to make payments at different locations through POS (point of sale) terminals. Mada assists in SADAD and SARIE payments and is suitable for routine payments.

It is evident that the number of transactions and value of payments of SADAD, SARIE, POS payments, and ATM usage have increased drastically due to the implementation of the technology, e-banking or m-banking in Saudi Arabia. The traditional payment and settlement mean like cheque clearing or interbank settlement is lowering year by year in Saudi Arabia. Problems of e-banking, m-banking, and satisfaction of the payment and settlement service users are important to enhance the level of service quality, and it will help indirectly individuals, businesses, and the government in achieving the aims of vision 2030 of Saudi Arabia.

1. LITERATURE REVIEW AND HYPOTHESES

Nowadays, payment and settlement systems are essential to fulfilling the requirement of payment in businesses and payment in the daily routine life of an individual. The contribution of payment and settlement systems is inevitable and cannot be underestimated in every aspect of an economy. The contribution of the payment and settlement system is not limited to a national territory. The ease, reliability, flexibility, rapidity, and low-cost payment accelerated the growth of the payment and settlement systems worldwide. Alyabes and Alsalloum (2018) found in their study that ease of use and self-efficacy attracts Saudi customers toward electronic payments. Alswaigh and Aloud (2021) indicated that usefulness, ease, lifestyle compatibility, and facilitating conditions attract customers to e-payments in Saudi Arabia. Alqahtani and Albahar (2022) elaborated in their study that security and payment methods affect consumers' perceptions of the Saudi Arabian market, and also discovered that security, trust, bene-

fits, reputation, and convenience are crucial factors in payment and settlement systems. Khan et al. (2017) observed that online payment methods are increasingly being used for daily online purchases as well as onsite purchases. The statistics of the study show that the number of customers giving priority to online payments mode is growing as online payments are more transparent and secure means of payment and settlement. Mohammed and Faleel (2021) found that mobile payments are growing rapidly as it is convenient, but due to low awareness of making electronic payments, cases of fraud, identity theft, and online payment facility, providers have been obliged to recover such cases for their clients. Alsenaidy and Alsafdi (2019) observed that mobile banking is growing rapidly, and is an extremely influential element in the world of e-commerce. They also found that Saudi Arabia is a prosperous nation and has many elements that reflect the continuing acceptance of the generally growing technology and online commerce. Almuhammadi (2020) observed that there is unparalleled growth in mobile payments and it is on-trend, especially among

youngsters in many countries like China, India, Saudi Arabia, and others. He also studied many other technologies associated with digital payments in Saudi Arabia. Saxena et al. (2019) studied that mobile payments are rising these days where online payments are easy to use after considering the challenges associated with mobile payments. Kakkad et al. (2021) stated that the payment system in India has also digitalized as in other countries. They also observed that in Saudi Arabia, the laborers who migrated from India also use an online payment system to send money to their families from Saudi to India. Aldaas (2021) found a relationship between the electronic payment system and economic growth and observed that online payments are increasing across the global electronic payment system and become a necessity for every corporate, government, and individual. He also found some downsides of electronic payments such as fraud, misuse of identity, and more. After examining the relationships between economic expansion and non-cash transactions, correlations were found to be strong and negative for Saudi Arabia and low and favorable for India. Hassan et al. (2020) found a significant growth in online payments and e-wallet payments. Ameerbakhsh et al. (2021) indicated that electronic payments are commonly used in Saudi Arabia, as well as in other Muslim countries. Payment and settlement systems are influenced by their neighboring countries. Astonishingly, the attitudes of consumers towards electronic payments are not substantially influenced by protection or trust. They have noticed that consumers trust online payments easily because they receive daily alerts from the companies that offer online transaction services and updates on any fraud instances. Chun (2019) studied the rules of liability for electronic business transactions when privacy or security breaks in E-transactions. If most of customers are worried about their security and there is a significant customer loss, the government may step in to subsidize businesses or customers by providing insurance against damage from fraud or hacking involving mobile transactions. AL-Majali and Bashabsheh (2016) established that security is the main factor that affects the satisfaction of bank customers. Singh and Rana (2017) found that the adoption of digital payment is not governed by demographic factors except education in India. Customers use digital payments in urban and ed-

ucated areas in India, frequently. Smartphones and advanced information technology enhance digital payments in India. Toriki et al. (2020) studied the effects of E-payment or mobile payment systems on the performance of the financial sector in selected Islamic nations. They found that electronic payments, including mobile banking, internet banking etc., positively affect the financial sector performance and growth of the economy. The population has a significant positive effect on financial sector performance. Although, M-banking (mobile banking) is believed to be important, a lack of awareness is still not widely accepted by the public. The online payment facility providers should give easier ways to use and offer more security to the users as online payments are in trend. He also studied the major factors that play a key role in customers' intentions. The focal point of the researchers is the security issues that arise due to the increasing use of electronic payments. Due to the security issues that arise when conducting online transactions, online payment service providers must possess certain protective qualities, specifically availability, secrecy, authentication, and authorization (Alkhaldi, 2016). Wu et al. (2021) found that while making cross-border mobile payments, there is convenience as well as hidden risks. So it is important to get the correct information of the users before the cross-border mobile transaction and carry out the real-name system. In cross-border mobile payment transactions, fingerprint payment, face scanning, and digital signature should be introduced to avoid risks. Lishomwa and Phiri (2020) found that online transactions are smooth and less time-consuming but still, there is a lack of trust among customers due to absence of face-to-face interactions which makes it very impersonal. They also found that customers who are not very familiar with internet banking, do not feel comfortable because of the doubts related to security issues. Customers use to deal with people in a physical bank system as it gives them face-to-face interactions. Liyanaarachchi et al. (2021) studied that banks should be more concerned about customers' online privacy. They found differences in customer observations of trust, responsibility confidence, and exchange of information and advocated that banks should formulate policies according to the need of customers. De Rose (2017) explained that e-payments attract customers due to more con-

venience and privacy to customers. E-payments have made their accessibility easier through Debit Card and avoid stress in handling cash and unwanted waste of time. Baabdullah et al. (2019) observed that the online payment system is valuable for both banks and customers in Saudi Arabia. Srouji (2020) observed that Saudi Arabia and fellow GCC countries have worked very hard to expand the digital payment system to improve tax and revenue collection transparency and security. Althothaily et al. (2017) observed that the current payment system focuses on reliability and security but pays less attention to users' behaviors and needs. Customers unable to go out to withdraw money can get assistance from their relatives or friends but it is not a secure way. Alkhalidi (2017) studied that mobile technology has become a very important thing in communication and information technology after the implementation of mobile technology in the business sector. He also observed that the number of mobile internet users is rapidly increasing in Saudi Arabia, and the government is investing in telecommunication infrastructure. Also, he suggested enhancing the awareness of customers towards M-banking. Souiden et al. (2020) found that security issues, social influence-based perspective, M-banking attribute-based perspective, customer-based perspective, and many more factors influence the adoption of M-banking. Also, Al-Malkawi et al. (2016) studied the adoption of online banking in Saudi Arabia. They found that Saudi banks need to focus on retailing their strategies and policies to make the online payment and settlement system user-friendly in Saudi Arabia. Sapparudin et al. (2020) observed the factor that influenced the intention of using M-banking is trust, which not only influences behavioral intention but also the concept of the UTAUT (Unified Theory of Acceptance and Use of Technology) model. Based on a survey, Alabdan and Sulphay (2020) found that 90% of the population is eager to utilize M-payment (mobile payment) services, and 75% agreed that these services are simple to use. Additionally, it has been noted that to encourage Saudi citizens and residents to utilize mobile payment systems, security concerns must be considered. 45% of M-payment users in Saudi Arabia said that many stores do not accept payments. Some Saudi Arabians choose not to use this service due to security concerns. Zamil et al. (2020) found a clear and positive relationship

between perceived ease of use, perceived usefulness, and trust-building in to use of mobile online shopping. They observed that different factors are responsible for adopting mobile online shopping services as the whole world is growing with the technology of mobile payment. Al-Tayyar et al. (2021) studied that the Saudi Arabian environment does not put much effort into adopting e-commerce on the local level. The efforts made by the government can be a key factor in increasing the adoption of online trade by SMEs in Saudi Arabia. As Saudi is a developing country, still there is no developmental drive in e-commerce. They also suggested awareness programs that can be from the government and policymakers to make the people understand various secure and trustworthy options for online payment. According to Das et al. (2020), the level of education is a significant factor when doing cashless transactions. They also observed that male customers are more comfortable than female customers in making online transactions. Older people are not comfortable with this cashless system. After being so popular still, some people are not comfortable with cashless transactions due to security issues. According to Bojjagani et al. (2021), m-payments have a significant impact on the development of the supply chain for companies and industries as well as the quick expansion of online markets. Compared to offline mode payments, m-payments are more effective. Several other factors, including the type of the m-payment channel used and the associated security infrastructure, the stakeholders involved, and the m-business models employed, were also mentioned as having an impact on the success of e-business. Walid and Sherzad (2020) found that in the last 10 years there is a fast change in technology, especially in information and communication technology, and the electronic payment system is one of the most affecting among them. They strongly suggested that educational programs and seminars teach the use of electronic payment systems. Saudi Arabia and UAE executed great work towards a cashless economy as both economies are heavily cash-reliant. Al Haliq and Al Muhirat (2016) observed that in Saudi Arabia, the online payment or electronic payment system is successful, but banks should raise client awareness. In some areas of Saudi Arabia, banks are doing good work to satisfy their customers regard-

ing the safe uses of electronic payments, but in some areas, customers are not satisfied with the adoption of electronic payments. They also found that Saudi e-banking should pay great attention to the issue of motivating customers to opt for electronic payments. Alamoudi et al. (2022) observed that the recent advancement of mobile technology has transformed banking and payment services as well as customer behavior. Furthermore, they observed value of m-banking has a positive impact on the users of Saudi Arabia.

Presently, very few studies are available regarding the various dimensions of the payment and settlement system and its efficiency in Saudi Arabia. The means of traditional payments and settlements negligibly contribute to the payment and settlement system, and customers are inclined towards e-payments and settlements in Saudi Arabia. Therefore, there is a need to study the payment and settlement system of Saudi Arabia to find out the growth, present status, as well as the problems, challenges, and opportunities of the e-payment and settlement system in Saudi Arabia. Below are the hypotheses framed to achieve the objectives of the study.

H₀1: The number of online payment and settlement users is increasing more than the number of traditional payment and settlement users.

H₀2: The value of online payment and settlement users is increasing more than that of traditional payment and settlement users.

H₀3: There is no significant dissatisfaction with security in E-payment and settlement service users in Saudi Arabia.

H₀4: There is no significant dissatisfaction with ease in E-payment and settlement service users in Saudi Arabia.

H₀5: There is no significant dissatisfaction with convenience in E-payment and settlement service users in Saudi Arabia.

H₀6: There is no significant dissatisfaction with traceability in E-payment and settlement service users in Saudi Arabia.

H₀7: There is no significant dissatisfaction with the speed of E-payment and settlement service users in Saudi Arabia.

2. METHODOLOGY

The study considers primary and secondary data to get the satisfaction, problems and challenges, and growth of the payment and settlement system in Saudi Arabia. The primary data were obtained by administering an online questionnaire, and 240 responses were received from Saudi nationals and non-Saudi nationals using payment and settlement services. The ranks, mean, and percentages are applied to analyze the satisfaction, problems, and challenges of the payment and settlement system of Saudi Arabia. To determine the growth of the payment and settlement methods, secondary data were gathered from the SAMA (Saudi Arabian Monetary Authority) websites. Point of Sale (POS), SADAD & SARIE, and Mada card payments are considered E-payments, while bank clearing of commercial and personal cheques, and Interbank Clearing of commercial cheques are treated as traditional payment and settlement means in the study. The following formulas are applied to know the trend (I_{FB}), average trend growth rate (GR_{AT}), and payment means weights ($W_{1,2,3,4,\dots}$) of payment and settlement data of Saudi Arabia from 2012 to 2021 (Ali & Salameh, 2021).

Fixed Base Index Numbers

$$(I_{FB}) = \frac{V_{cy}}{V_{by}} \cdot 100. \quad (1)$$

Average Trend Growth Rate

$$(GR_{AT}) = \frac{(Average\ of\ FBI - 100)}{Average\ of\ FBI} \cdot 100. \quad (2)$$

Payment Means weights

$$(W_{1,2,3,4,\dots}) = \frac{APM}{TAPAM} \cdot 100. \quad (3)$$

where, V_{CY} = Variables in the current year, V_{BY} = Variables in the base year, APM = Amount of Payment of a Means, and $TAPAM$ = Total Amount of Payment of All Means.

2.1. Limitations of the study

The authenticity and the relevancy of the results of primary data depend on the response quality of the respondents. There is only consideration of the responses of E-payment and settlement service users as the traditional payment and settlement service users are negligible in Saudi Arabia in the study period. Secondary data are considered only for the period 2012 to 2021 to get the trend of payment and settlement means in Saudi Arabia.

3. RESULTS

Payments and settlements means is increasing not only horizontally but also vertically in Saudi Arabia. In 2007, 43,513,397 SADAD payments were made, of which 18,879,056 (43.39%) through SADAD and 24,634,341 (56.61%) through other channels. In 2021, 311,568,408 SADAD payments were made, of which 293,158,932 (94.09%) through SADAD and 18,409,476 (5.91%) through other channels (Saudi Central Bank, 2022). This shows that the payments through the SADAD system not only increase absolutely, but also proportionately. In 2004, SARIE customers' payments, interbank payments, and other payments were 1,029,008; 6,986,702; and 8,024,035 thousand SA riyals, which increased up to 8,896,213.2; 48,560,941.4; and 57,832,429 thousand SA riyals in 2021. There was an absolute and proportionate increment in all SARIE payments since 2004, while decrementing in the SARIE interbank payments in 2021. Total SARIE payments increased by more than 6 times (from 16,039,745 thousand SA riyals to 115,289,583.6 thousand SA riyals) (Saudi Central Bank, 2022).

In 1995, the number of points of sale terminals (POS), number of transactions by POS, and sales were 14,020; 4,470,498; and 2,005,532 (thousand SA riyals), while increased to 1,013,141; 5,171,154,926; and 473,258,166 (thousands SA riyals). Since 1995, the number of transactions by POS increased by more than 72 times, while the number of transactions and sales increased by 1156 times and 236 times, respectively (Saudi Central Bank, 2022). This shows an increment in the frequency of using POS payments. Using POS payments to settle smaller transactions is becoming more and

more popular in Saudi Arabia. There is a decreasing trend in the Bank clearing of commercial and personal cheques, Interbank clearing of commercial cheques, and bank clearing in Saudi Arabia. In 1996, the number of banks' Clearing commercial and Personal cheques and their value was 6,168,265 and 317,269.3 thousand SA riyals, while it decreased and stood at 1,569,797 (decreased by 4 times) and 178,531.807 thousand SA riyals, decreased by 1.78 times in 2021. The number and value of interbank clearing of commercial cheques were 1,743,333 and 2,989,239 thousand SA riyals in 1996 and it decreased up to 326,401 (decreased by more than 5 times) and 185,580.444 (decreased by more than 16 times) thousand SA riyals in 2021. The numbers and value of bank clearing of Commercial and Personal cheques were 5,462.477 thousand and 310,535 thousand SA riyals in 1994 and it came down 1,569.797 thousand (decreased by more than 3 times) and 178531.806 (approximately 2 times) thousand SA riyals in 2021. Also, the numbers and value of bank clearing of interbank cheques were 1,747.79 thousand and 1,978,700 thousand SA riyals in 1994 and it came down 326.401 (decreased by more than 5 times) and 185,580.445 thousand SA (decreased by more than 10 times) SA riyals in 2021. In Saudi Arabia, the number of ATMs (automated teller machines) and ATM cards was 1,591 and 3,052,058 in 1997, and it increased to 16,544 (increased more than 10 times) and 39,373,810 (increased more than 12 times) in 2021 (Saudi Central Bank, 2022).

3.1. Growth of payment and settlement means (by number of transactions)

Growth of payment and settlement means (number of transactions wise) refers to the absolute and relative growth of frequency of payment and settlement means in Saudi Arabia.

Table 1 indicates that from 2012 to 2021, online payment and settlement methods in Saudi Arabia are growing faster than traditional payment and settlement methods (measured by the number of transactions). Between 2012 and 2021, the total amount of transactions expanded at an average annual rate of 26%. The average growth rates of Point of Sale (POS – 56%), E-payment (38%), and Mada payments (24%) are increasing more than

Table 1. Growth of payment and settlement means in Saudi Arabia (by number of transactions)

Source: Saudi Central Bank (2022).

Year	E-payment (A)	I _{FB}	Mada (B)	I _{FB}	POS (C)	I _{FB}	Bank clearing of comm. & personal cheques (D)	I _{FB}	Interbank Clearing of comm. cheques (E)	I _{FB}	Total (F) = (A+B+C+D+E)	I _{FB}
	2012	207,312,165	100	1,332,995,936	100	0	0	6,420,624	100	945,895	100	1,547,674,620
2013	218,798,997	106	1,335,640,558	100	0	0	6,281,148	98	844,466	89	1,561,565,169	101
2014	248,363,345	120	1,528,992,654	115	0	0	6,024,317	94	782,271	83	1,784,162,587	115
2015	272,445,041	131	1,795,535,433	135	0	0	5,712,132	89	947,723	100	2,074,640,329	134
2016	286,085,581	138	1,922,694,441	144	524,569.74	100	4,911,628	76	545,643	58	2,214,761,863	143
2017	329,387,363	159	2,012,371,181	151	708,119.18	135	4,264,517	66	495,393	52	2,347,226,573	152
2018	379,218,518	183	2,125,660,116	159	1,031,518.19	197	3,367,653	52	412,690	44	2,509,690,495	162
2019	428,650,582	207	2,124,773,657	159	1,623,002.74	309	2,875,732	45	402,933	43	2,558,325,907	165
2020	480,527,741	232	1,746,667,226	131	2,852,864.28	544	1,882,363	29	307,433	33	2,232,237,627	144
2021	478,454,092	231	1,617,191,086	121	5,171,154.93	986	1,569,797	24	326,401	35	2,102,712,531	136
Mean	332,924,342.50	161	1,754,252,229	132	1,191,122.91	227	4,330,991.10	67	601,085	64	2,093,299,770	135
	-15.90%		-83.80%		-0.06%		-0.21%		-0.03%			
GR _{AT}	-	38	-	24	-	56	-	-49	-	-56	-	26
R1(Mean)	2	-	1	-	4	-	3	-	5	-	-	-
R2(GR _{AT})	-	2	-	3	-	1	-	4	-	5	-	-

the traditional payment and settlement means, *i.e.* bank clearing of commercial and personal cheques (-49%); and Interbank Clearing of commercial cheques (-56%). The number of transactions of online payments and settlements is increasing more than the number of traditional payment and settlement means. Growth of the number of transactions of bank clearing of commercial

and personal cheques; and interbank clearing of commercial cheques is negative from 2012 to 2012. On average, Mada and E-payment settle 83.80% and 15.90% of the total transactions, while only less than 1% of payment and settlement transactions are executed by the POS (0.06%), bank clearing of commercial and personal cheques (0.21%); and interbank clearing of commercial cheques

Table 2. Weights and composition trend of payment and settlement means in Saudi Arabia (by number of transactions)

Source: Saudi Central Bank (2022).

Year	Total (F) = (A+B+C+D+E)	E-payment (A)		Mada (B)		POS (C)		Bank clearing of comm. & personal cheques (D)		Interbank Clearing of comm. cheques (E)		
	Total Payments' means	I _{FB}	W ₁	I _{FB}	W ₂	I _{FB}	W ₃	I _{FB}	W ₄	I _{FB}	W ₅	I _{FB}
2012	1,547,674,620	100	13.4	100	86.13	100	-	-	0.41	100	0.06	100
2013	1,561,565,169	101	14.01	104.56	85.53	99.31	-	-	0.4	98.11	0.05	90.13
2014	1,784,162,587	115	13.92	103.88	85.7	99.5	-	-	0.34	82.35	0.04	73.08
2015	2,074,640,329	134	13.13	98	86.55	100.48	-	-	0.28	67.15	0.05	76.14
2016	2,214,761,863	143	10.45	77.95	70.2	81.51	19.15	100	0.18	43.74	0.02	33.2
2017	2,347,226,573	152	10.78	80.47	65.88	76.49	23.18	121.05	0.14	34.05	0.02	27.03
2018	2,509,690,495	162	10.71	79.94	60.04	69.71	29.14	152.15	0.1	23.2	0.01	19.43
2019	2,558,325,907	165	10.26	76.53	50.84	59.02	38.83	202.77	0.07	16.78	0.01	16.07
2020	2,232,237,627	144	9.46	70.56	34.37	39.9	56.13	293.13	0.04	9.03	0.01	10.08
2021	2,102,712,531	136	6.58	49.12	22.25	25.83	71.14	371.5	0.02	5.27	0	7.48
Mean	-		11.27	84.1	64.75	75.18	39.6	206.77	0.2	48.09	0.03	45.45
GR _{AT}	-		-	-18.90	-	-33.01	-	51.64	-	-107.94	-	-120.02
R1(W)	-		3	-	1	-	2	-	4	-	5	-
R2(GR _{AT})	-		-	2	-	3	-	1	-	4	-	5

(0.03%) (Table 1). But, POS is in highest growth rate among all payment and settlement means in Saudi Arabia. Possibly, the number of transactions of POS increased drastically in the year 2019, 2020, and 2021 due to corona or the inclination of customers toward card payments.

Table 2 reveals that Mada (64.75%), POS transactions (39.60%), and E-payments (11.27%) play a crucial role in the payment and settlement of the transaction in Saudi Arabia from 2012 to 2021, while bank clearing of commercial and personal cheques (0.20%) and interbank clearing of commercial cheques (0.03%) negligibly contribute to the payment and settlement in Saudi Arabia. The average growth rate of contribution by the POS is only positive, while Mada (-33.01%) and E-payment (-18.90%) are bigger contributors, but the average growth rate of contribution is negative. The average growth rate of contribution of the bank clearing of commercial and personal cheques (-107.94%), and interbank clearing of commercial cheques (-120.02%) transactions is negative (Table 2). The inhabitants of Saudi Arabia are inclining towards POS transactions and lower payments through the traditional system. The number of online payment and settlement users is increasing more than the number of traditional payment and settlement users. Hence, H_0I is accepted.

3.2. Growth of payment and settlement means (by the value of transactions)

Growth of payment and settlement means (value of transactions wise) refers to the absolute and relative growth of weights of the amount of payment and settlement means in Saudi Arabia.

Table 3 indicates that in Saudi Arabia, online payment and settlement means value (amount) wise are increasing year by year more than the traditional payment and settlement means from 2012 to 2021. The mean growth rate of the amount of all transactions from 2012 to 2021 is 57%. The average growth rate of the amount of Point of Sale (POS - 37%), E-payment (44%), and Mada payments (47%) are increasing more than the traditional payment and settlement means, i.e. bank clearing of commercial and personal cheques (-51%); and interbank clearing of commercial cheques (-49%). The amount of transactions of online payments and settlements is increasing more than the traditional payment and settlement means. Growth of amount of transactions of bank clearing of commercial & personal cheques; and interbank clearing of commercial cheques is negative in the period 2012 to 2021. On average, Mada, POS and E-payment settle 25.97%, 32.30%, and 41.67% of the total transactions' amount, while only less

Table 3. Growth of payment and settlement means in Saudi Arabia (by value of transactions, thousands SA riyals)

Source: Saudi Central Bank (2022).

Year	E-payment (A)	I _{FB}	Mada (B)	I _{FB}	POS (C)	I _{FB}	Bank clearing of comm. & personal cheques (D)	I _{FB}	Interbank Clearing of comm. cheques, (E)	I _{FB}	Total (F) = (A+B+C+D+E)	I _{FB}
2012	208,386,870.90	100	122,225,709	100	0	0	628,229	100	209,385	100	331,450,193.90	100
2013	235,889,308	113	134,194,183.40	110	0	0	635,789	101	243,096	116	370,962,376.40	112
2014	254,355,454.10	122	159,970,264.50	131	0	0	646,477	103	250,911.75	120	415,223,107.30	125
2015	271,585,375	130	172,835,452.80	141	0	0	541,651.40	86	215,533	103	445,178,012.20	134
2016	278,031,083	133	182,748,678.50	150	182,748,678.50	100	410,452.58	65	147,625.70	71	644,086,518.30	194
2017	329,013,675.30	158	200,467,827.10	164	200,467,827.10	110	352,417	56	128,362.82	61	730,430,109.30	220
2018	424,490,206.90	204	232,305,825	190	232,305,825	127	285,077.53	45	108,689.87	52	889,495,624.30	268
2019	500,963,479.60	240	287,794,256.30	235	287,794,256.30	157	260,473.04	41	130,818.51	62	1,076,943,284	325
2020	550,249,285.10	264	357,297,966.50	292	357,297,966.50	196	183,573.35	29	135,381.37	65	1,265,164,173	382
2021	675,222,323.80	324	473,258,165.60	387	473,258,165.60	259	178,531.81	28	185,580.44	89	1,622,102,767	489
Mean	372,818,706.20	179	232,309,832.90	190	288,978,786.50	158	412,267.17	66	175,538.45	84	7,791,036,166	235
	-41.67%		-25.97%		-32.30%		-0.05%		-0.02			
GR _{AT}	-	44	-	47	-	37	-	-51	-	-19	-	57
R1 (Mean)	1	-	3	-	2	-	5	-	4	-	-	-
R2 (GR _{AT})	-	2	-	1	-	3	-	5	-	4	-	-

Table 4. Weights and composition trend of payment and settlement means in Saudi Arabia (by value of transactions)

Source: Saudi Central Bank (2022).

Year	Total (F) = (A+B+C+D+E)		E-payment (A)		Mada (B)		POS (C)		Bank clearing of comm. & personal cheques (D)		Interbank Clearing of comm. cheques (E)	
	(thousands SAR)		W_1	I_{FB}	W_2	I_{FB}	W_3	I_{FB}	W_4	I_{FB}	W_5	I_{FB}
	Total Payments amount	I_{FB}										
2012	331,450,193.90	100	62.87	100	36.88	100	0		0.19	100	0.06	100
2013	370,962,376.40	112	63.59	101.1	36.17	98.09	0		0.17	90.2	0.07	109.22
2014	415,223,107.30	125	61.26	97.44	38.53	104.46	0		0.16	81.94	0.06	100.71
2015	445,178,012.20	134	61.01	97.04	38.82	105.27	0		0.12	64.04	0.05	80.69
2016	644,086,518.30	194	43.17	68.66	28.37	76.93	28.37	100	0.06	33.54	0.02	38.2
2017	730,430,109.30	220	45.04	71.65	27.45	74.42	27.45	96.7	0.05	25.39	0.02	29.29
2018	889,495,624.30	268	47.72	75.91	26.12	70.82	26.12	92.1	0.03	16.87	0.01	20.37
2019	1,076,943,284	325	46.52	73.99	26.72	72.46	26.72	94.2	0.02	12.73	0.01	20.25
2020	1,265,164,173	382	43.49	69.18	28.24	76.58	28.24	99.6	0.01	7.64	0.01	17.83
2021	1,622,102,767	489	41.63	66.21	29.18	79.11	29.18	103	0.01	5.79	0.01	19.07
Mean	7,791,036,166	235	51.63	82.12	31.65	85.81	16.61	97.6	0.08	43.81	0.03	53.56
GR _{AT}	–	57	–	–21.77	–	–16.54	–	–2.5	–	–128.26	–	–86.71
R1 (W)	–	1	–	2	–	3	–	4	–	5	–	–
R2 (GR _{AT})	–	–	3	–	2	–	1	–	5	–	4	–

than 1% of payment and settlement transactions executed by the bank clearing of commercial & personal cheques (0.05%); and interbank clearing of commercial cheques (0.02%) (Table 3). But, Mada is in the highest amount of transactions growth rate among all payment and settlement means in Saudi Arabia. Possibly, the number of transactions of Mada increased drastically in the year 2019, 2020, and 2021 due to corona or the inclination of customers toward card payments.

Table 4 reveals that Mada (31.65%), POS transactions (16.61%), and E-payments (51.63%) play a crucial role in the payment and settlement of the transaction in Saudi Arabia from 2012 to 2021, while bank clearing of commercial and personal cheques (0.08%) and interbank clearing of commercial cheques (0.03%) negligibly contribute to the amount of payment and settlement in Saudi Arabia. The average growth rate of the amount of payment and settlements by the E-payment, Mada, and POS is –21.77%, –16.54%, and –2.5%, respectively. The average growth rate of the bank clearing of commercial and personal cheques (–128.26%), and interbank clearing of commercial cheque

(–86.78%) transactions is negative (Table 4). The average growth rate of the value of payments and settlements by all the payments and settlements is negative. The value of transactions shows the inclination of inhabitants toward E-payment, Mada, and POS, and lowers the value of payment settlements through the bank clearing of commercial and personal cheques and interbank clearing of commercial cheques. However, the average growth in the amount of all means of payments and settlements is negative. But, the value of online payment and settlement users is less negative than that of traditional payment and settlement users. Hence, H_0 is accepted.

3.3. Payment and settlement satisfaction in Saudi Arabia

Satisfaction with payments and settlements refers to security, ease, convenience, traceability, and speed in E-payment and settlement system in Saudi Arabia.

Table 5 reveals that payment and settlement users are 39% and 22% satisfied (A) and strongly satis-

Table 5. Payment and settlement users' responses on security in payment services in Saudi Arabia

Source: Authors' elaboration based on e-survey.

No.	Variables	SA	A	N	DA	SDA	TOTAL
1	Most secure payment system	63(2)	109(1)	55(3)	12(4)	1(5)	240
2	No fear of hacking bank website	35(4)	81(1)	71(2)	47(3)	6(5)	240
3	Great security for all transactions	52(3)	104(1)	66(2)	16(4)	2(5)	240
4	Privacy and integrity of personal information can NOT be compromised	61(2)	83(1)	70(3)	22(4)	4(5)	240
Average/Rank/Percentage		53/(3)/22%	94/(1)/39%	66/(2)/28%	24/(4)/10%	3/(5)/1%	240

fied (SA) with security factors in payment and settlement in Saudi Arabia, while 10% and 1% are dissatisfied (DA) and strongly dissatisfied (SDA). Even, strongly satisfied users are worried about the fear of hacking bank websites and security in transactions. Overall, rank analysis reveals that strongly satisfied payment and settlement customers are in the second rank. This implies the requirement for enhancement in all security factors in payment and settlement services in Saudi Arabia. 61% of E-payment and settlement users are either strongly satisfied or satisfied, while 28% of E-payment service users neither satisfied nor dissatisfied (N) with the security concern in Saudi Arabia (Table 5). The neutrally satisfied users can be converted into satisfied or strongly satisfied users after considering their opinion regarding security in payment and settlement system. Hence, H_03 is accepted.

Table 6 indicating that consumers of payments and settlements are respectively 40% and 38% strongly satisfied (SA) and satisfied (A) with the

ease aspect, whereas 4% and 1% are dissatisfied (DA) and strongly dissatisfied (SDA), respectively. Even, strongly satisfied users report errors in the payments. Overall, rank analysis reveals that strongly satisfied payment and settlement customers rank first. Errors in payments and settlements make the satisfaction of highly satisfied users lower in Saudi Arabia (Table 6). Reducing the errors in the payments and settlements and providing the facility of flexibility enhances the ease level of payments and settlements in Saudi Arabia. 16% of E-payment service users are neither satisfied nor dissatisfied (N) with the ease concern and they can be converted into satisfied or strongly satisfied users after considering their opinion regarding ease in the payment settlement system. Hence, H_04 is accepted.

Table 7 reveals that 3% and 1% of Saudi Arabia's payment and settlement users are unsatisfied (DA) and highly dissatisfied (SDA), respectively, 38% and 41% are strongly satisfied (SA) and satisfied (A) with the convenience element. The rank

Table 6. Payment and settlement users' responses on ease in payment services in Saudi Arabia

Source: Authors' elaboration based on e-survey.

No.	Variables	SA	A	N	DA	SDA	TOTAL
1	Easier payment than traditional payment system	139(1)	69(2)	26(3)	6(4)	0(5)	240
2	Reduces errors in the payments	49(3)	102(1)	62(2)	21(4)	6(5)	240
3	Flexibility	99(2)	105(1)	29(3)	5(4)	2(5)	240
Average/Rank/Percentage		96/(1)/40%	92/(2)/38%	39/(3)/16%	11/(4)/4%	3/(5)/1%	240

Table 7. Payment and settlement users' responses on convenience in payment services in Saudi Arabia

Source: Authors' elaboration based on e-survey.

No.	Variables	SA	A	N	DA	SDA	TOTAL
1	E-payment system is stress free.	92(2)	104(1)	36(3)	6(4)	2(5)	240
2	No need to appear in the bank physically	107(1)	85(2)	39(3)	6(4)	3(5)	240
3	Convenience of 24x7 access	113(1)	84(2)	36(3)	6(4)	1(5)	240
4	Effortless accessibility for differently abled people	75(2)	106(1)	50(3)	6(4)	3(5)	240
5	Facilitating the alerts regarding the payments	67(2)	118(1)	47(3)	6(4)	2(5)	240
Average/Rank/Percentage		91/(2)/38%	99/(1)/41%	42/(3)/17%	6/(4)/3%	2/(5)/1%	240

Table 8. Payment and settlement users' responses on traceability in payment services in Saudi Arabia

Source: Authors' elaboration based on e-survey.

No.	Variables	SA	A	N	DA	SDA	TOTAL
1	Not disclosing the source of income	50(3)	109(1)	60(2)	13(4)	8(5)	240
2	Availability of standard format for the remittance of funds	46(3)	94(1)	80(2)	15(4)	5(5)	240
3	No complexity in the tracing of the transaction	60(3)	103(1)	69(2)	6(4)	2(5)	240
4	Systematic process available to know the other parties of the remittance	49(3)	113(1)	65(2)	11(4)	2(5)	240
Average/Rank/Percentage		51/(3)/21%	105/(1)/44%	69/(2)/29%	11/(4)/4%	4/(5)/2%	240

of strongly satisfied users is second due to stress, alerts, and accessibility of differently-abled people to payment and settlement (Table 7). Focusing on convenient accessibility for differently-abled people, alert facilities, and making E-payment and settlement systems stress-free will enhance user satisfaction. 17% of E-payment service users are neither satisfied nor dissatisfied (N) with the convenience concern and they can be converted into satisfied or strongly satisfied users after considering their opinion regarding convenience of the payment and settlement system. Hence, H_05 is accepted.

Table 8 indicates that 5% and 2% of Saudi Arabia's payment and settlement users are unsatisfied (DA) and strongly dissatisfied (SDA), respectively, with traceability elements, 21% and 44% of users are strongly satisfied (SA) and satisfied (A). The rank of strongly satisfied users is third due to disclosing the source of income, unavailability of a standard format for the remittance of funds, complexity in the tracing of the transaction, and unavailability of a systematic process to know the other parties of the remittance (Table 8). There is a need to consider all traceability factors in E-payment to convert satisfied and neutral users into strongly satisfied users of the payment and settlement system in Saudi Arabia. 29% of E-payment service users are neither satisfied nor dissatisfied (N) with the traceability, concern and they can be converted into satisfied or strongly satisfied users after con-

sidering their opinion regarding traceability in the payment and settlement system. Hence, H_06 is accepted.

Table 9 reveals that users of electronic payments and settlements in Saudi Arabia are 34% and 43% strongly satisfied (SA) and satisfied (A) with the speed of payment and settlement process. While 3% and 1% are dissatisfied (DA) and strongly dissatisfied (SDA) with the speed factor of payment and settlement. The rank of strongly satisfied users is second due to services of timely payment, receiving alerts regarding the payments, and cherishing receiving alerts for early payment (Table 9). 18% of E-payment service users neither satisfied nor dissatisfied (N) with the speed concern and they can be converted into satisfied or strongly satisfied users after considering their opinion regarding speed in the payment and settlement system. Hence, H_07 is accepted.

4. DISCUSSION

Online payment and settlement means contribute more than traditional payment and settlement means in Saudi Arabia (Khan et al., 2017). The number of transactions and their value is increasing more than the traditional payment and settlement means in Saudi Arabia. There is a negative trend in the payment and settlement through the clearing of commercial and personal cheques

Table 9. Payment and settlement users' responses on speed in payment services in Saudi Arabia

Source: Authors' elaboration based on e-survey.

No.	Variables	SA	A	N	DA	SDA	TOTAL
1	Timely payment	87(2)	99(1)	46	6(4)	2(5)	240
2	Receiving/ paying periodical payment is very fast	99(1)	94(2)	35	8(4)	4(5)	240
3	Receiving alerts regarding the payments	84(2)	104(1)	46	3(4)	3(5)	240
4	Cherishing on receiving alert for early payment	61(2)	120(1)	48	10(4)	1(5)	240
Average/Rank/Percentage		83/(2)/34%	104/(1)/43%	44/(3)/18%	7/(4)/3%	3/(5)/1%	240

and interbank commercial cheques. Possibly, the reason for the inclination toward online payments and settlements is trust in Saudi Arabia (Ameerbakhsh et al., 2021). In the payment and settlement system, online payments and settlements are less time-consuming (Lishomwa & Phiri, 2020). The online payment and settlement system is advantageous for banks and service users (Baabdullah et al., 2019a; 2019b). In Saudi Arabia, mobile payment is on-trend and enhancing the use of technology in payments and settlements (Almuhammadi, 2020; Bojjagani et al., 2021; Alsenaidy & Alsafdi, 2019). 10% of online payment and settlement service users report security issues due to fraud and identity theft (Mohammed & Faleel, 2021). The payment and settlement system can consider the security in online payments to enhance customer satisfaction as only 61% of E-payment users are satisfied with the security concern (Table 5). Online payment and settlement service providers have to consider confidentiality, authentication, and authorization to enhance the security of online payments (Hassan et al., 2020; Chun, 2019). In Saudi Arabia, three-fourths of users of E-payment and settlements reveal easiness in E-payment and settlements (Alabdhan & Sulphay, 2020; Zamil et al., 2020). The online/E-payment and settlement are convenient for customers. Mobile banking adop-

tion is influenced by a variety of factors, including the customer-based perspective (Souiden et al., 2020). The level of convenience or proportion of strongly satisfied users can be enhanced by the lowering of the problems of alerts and accessibility of differently-abled people to payment and settlement and stress in using online payment and payment means. Traceability is another important factor that affects the level of customer satisfaction in payment and settlement. The traceability of transactions is very important in domestic and international payments and settlements. In Saudi Arabia, only 65% of users are either satisfied or strongly satisfied with the traceability of the transactions in the payment and settlement system (Table 8). There are requirements to consider complexity in the tracing of the transaction, and the unavailability of a systematic process to know the other parties of the remittance. Most of the customers' inclination toward E-payments and settlements is due to speedy payments and settlements (De Rose, 2017). In Saudi Arabia, three-fourths of service users are satisfied with E-payment and settlement services. The level of satisfaction with speedy payments can be enhanced by providing a timely payment facility, receiving alerts regarding the payments, and enhancing security and traceability in the online payment and settlement system in Saudi Arabia.

CONCLUSIONS

The study focused on the growth trend of the Saudi Arabian payment and settlement system and the satisfaction of payment and settlement users in Saudi Arabia to achieve the ultimate goals of the 2030 vision. There is a negative trend in the traditional payment and settlement system, i.e. payments and settlements through the personal and commercial cheques, and interbank commercial cheques from 2012 to 2021. Mada and E-payment (SADAD and SARIE) are the biggest contributors to online payment, while POS is the fastest growing means of payments and settlements in Saudi Arabia. The contribution of traditional means of payment and settlement is negligible and tends to decrease. Most of the customers using online payment and settlement services are satisfied with various dimensions of the E-payment and settlement system in Saudi Arabia. In Saudi Arabia, payment and settlement customers consider security primarily. Security is the prime factor that governs the satisfaction of customers in the payment and settlement system. Ease, convenience, and speed in payment and settlement are satisfactory, while some issues are associated with the security and traceability of transactions in Saudi Arabia. Fear of hacking bank websites, security for all transactions, and privacy are the main factors that affect the security of the E-payment and settlement system in Saudi Arabia. Disclosing the source of income, unavailability of a standard format for the remittance of funds, complexity in the tracing of the transactions, and unavailability of a systematic process to know the other parties of the remittance creates the low traceability in the payment and settlement system in Saudi Arabia. Therefore, all variables that can improve the security and traceability of payment and settlement in Saudi Arabia must be taken in-

to account, while the benefits of the E-payment system can be achieved by creating awareness among people. The study considers only a limited number of respondents, and limited data to get the payment and settlement users' satisfaction, status, growth, and development of payment and settlement means in Saudi Arabia. In addition, to obtain more accurate results on the payment and settlement system of Saudi Arabia, a large number of payment and settlement users, bank executives, and employees and detailed data on payment and settlement means can be considered.

AUTHOR CONTRIBUTIONS

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REFERENCES

1. Alabdan, R., & Sulphay, M. M. (2020). Understanding proximity mobile payment acceptance among Saudi individuals: An exploratory study. *International Journal of Advanced Computer Science and Applications*, 11(4), 264-270. <https://dx.doi.org/10.14569/IJAC-SA.2020.0110436>
2. Alamoudi, H. O., Alharthi, M. D., Shaikh, A. A., & Haddoud, M. Y. (2022). Examining the antecedents and consequences of perceived value – a case study of mobile banking application usage in the Kingdom of Saudi Arabia. *International Journal of Mobile Communications*, 20(3), 263-284. <https://doi.org/10.1504/IJMC.2022.122609>
3. Aldaas, A. (2021). A study on electronic payments and economic growth: Global evidences. *Accounting*, 7(2), 409-414. <http://dx.doi.org/10.5267/j.ac.2020.11.010>
4. AlHaliq, H. A., & AlMuhirat, A. A. (2016). Customer satisfaction with electronic banking services in the Saudi banking sector. *Asian Social Science*, 12(5), 139-146. <http://dx.doi.org/10.5539/ass.v12n5p139>
5. Althothaily, A., Alrawais, A., Song, T., Lin, B., & Cheng, X. (2017). Quick cash: secure transfer payment systems. *Sensors*, 17(6), 1376. <https://doi.org/10.3390/s17061376>
6. Ali, A., & Salameh, A. A. (2021). Role of travel and tourism sector in the attainment of vision 2030 in Saudi Arabia: An analytical study. *Problems and Perspectives in Management*, 19(2), 276-290. [http://dx.doi.org/10.21511/ppm.19\(2\).2021.23](http://dx.doi.org/10.21511/ppm.19(2).2021.23)
7. Alkhaldi, A. N. (2016). Adoption of mobile banking in Saudi Arabia: An empirical evaluation study. *International Journal of Managing Information Technology*, 8(2), 1-14. <http://dx.doi.org/10.5121/ijmit.2016.8201>
8. Alkhaldi, A. N. (2017). An empirical examination of customers' mobile phone experience and awareness of mobile banking services in mobile banking in Saudi Arabia. *Interdisciplinary Journal of Information, Knowledge, and Management*, 12, 283-308. <http://dx.doi.org/10.28945/3887>
9. AL-Majali, M. M., & Bashabsheh, A. A. (2016). Factors that affect commercial banks

- customers intention towards electronic payment services in Jordan. *International Business Research*, 9(3), 79-96. <https://doi.org/10.5539/ibr.v9n3p79>
10. Al-Malkawi, H. A. N., Mansumitichai, S., & Al-Habib, M. (2016). Online banking in an emerging market: evidence from Saudi Arabia. *International Journal of Electronic Finance*, 9(1), 1-17. <https://doi.org/10.1504/IJEF.2016.083498>
 11. Almuhammadi, A. (2020). An overview of mobile payments, fintech, and digital wallet in Saudi Arabia. In *2020 7th International Conference on Computing for Sustainable Global Development (InaCom)* (pp. 271-278). IEEE. <https://doi.org/10.23919/INDIA-Com49435.2020.9083726>
 12. Alqahtani, M., & Albahar, M. A. (2022). The Impact of Security and Payment Method on Consumers' Perception of Marketplace in Saudi Arabia. *International Journal of Advanced Computer Science and Applications*, 13(5), 81-88. <https://doi.org/10.14569/IJACSA.2022.0130511>
 13. Alsenaidy, S., & Alsafdi, L. (2019). Electronic Payment System and Emerging Technology and Potential Impact on Economy in Saudi Arabia. *Iconic research and Engineering Journals*, 2(10), 16-31. Retrieved from <https://www.irejournals.com/formatedpaper/1701104.pdf>
 14. Alswaigh, N. Y., & Aloud, M. E. (2021). Factors Affecting User Adoption of E-Payment Services Available in Mobile Wallets in Saudi Arabia. *International Journal of Computer Science & Network Security*, 21(6), 222-230. <https://doi.org/10.22937/IJC-SNS.2021.21.6.29>
 15. Al-Tayyar, R. S., Abdullah, A. R. B., Abd Rahman, A., & Ali, M. H. (2021). Challenges and obstacles facing SMEs in the adoption of e-commerce in developing countries; A case of Saudi Arabia. *Studies of Applied Economics*, 39(4), 1-11 <http://dx.doi.org/10.25115/eea.v39i4.4644>
 16. Alyabes, A. F., & Alsalloum, O. (2018). Factors affecting consumers' perception of electronic payment in Saudi Arabia. *European Journal of Business and Management*, 10(27), 36-45. Retrieved from <https://core.ac.uk/download/pdf/234628573.pdf>
 17. Ameerbakhsh, O. Z., Alfadli, I. M., & Ghabban, F. M. (2021). Factors Affecting Saudi Consumers' Acceptance Towards the Use of Electronic Payment. *Engineering Letters*, 29(1), 1-17. <https://doi.org/10.5281/zenodo.4719550>
 18. Baabdullah, A. M., Alalwan, A. A., Rana, N. P., Kizgin, H., & Patil, P. (2019a). Consumer use of mobile banking (M-Banking) in Saudi Arabia: Towards an integrated model. *International Journal of Information Management*, 44, 38-52. <https://doi.org/10.1016/j.ijinfomgt.2018.09.002>
 19. Baabdullah, A. M., Alalwan, A. A., Rana, N. P., Patil, P., & Dwivedi, Y. K. (2019b). An integrated model for m-banking adoption in Saudi Arabia. *International Journal of Bank Marketing*, 37(2), 452-478. <https://doi.org/10.1108/IJBM-07-2018-0183>
 20. Bojjagani, S., Sastry, V. N., Chen, C. M., Kumari, S., & Khan, M. K. (2021). Systematic survey of mobile payments, protocols, and security infrastructure. *Journal of Ambient Intelligence and Humanized Computing*, 1-46. <http://doi.org/10.1007/s12652-021-03316-4>
 21. Chun, S.-H. (2019). E-commerce liability and security breaches in mobile payment for e-business sustainability. *Sustainability*, 11(3), 715. <http://dx.doi.org/10.3390/su11030715>
 22. Das, D., Kumar, K., & Mahapatra, R. (2020). Customer Perception Towards Payment Bank: A Case Study of Cuttack City. *International Journal of Management*, 10(4), 1-8. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3524162
 23. De Rose, D. V. J. L. (2017). A Study on Consumer Preference towards e-Payments. *International Journal of Advance Research in Computer Science and Management Studies*, 5(2), 5-9. Retrieved from https://www.academia.edu/35039190/A_Study_on_Consumer_Preference_towards_e_Payments
 24. Hassan, M. A., Shukur, Z., Hasan, M. K., & Al-Khaleefa, A. S. (2020). A review on electronic payments security. *Symmetry*, 12(8), 1344. <http://dx.doi.org/10.3390/sym12081344>
 25. Kakkad, S. A., & Jadhav, H. V. (2021). A Detailed Analysis of Selected Digital Payment Systems in India. *Arthshastra Indian Journal of Economics & Research*, 10(1), 41-58. <http://dx.doi.org/10.17010/ajer/2021/v10i1/155366>
 26. Khalid, A., Lee, O. O. K., Choi, M., & Ahn, J. (2018). The effects of customer satisfaction with e-commerce system. *Journal of Theoretical and Applied Information Technology*, 96(2), 481-491. Retrieved from <http://www.jatit.org/volumes/Vol96No2/20Vol96No2.pdf>
 27. Khan, B. U. I., Olanrewaju, R. F., Baba, A. M., Langoo, A. A., & Assad, S. (2017). A compendious study of online payment systems: Past developments, present impact, and future considerations. *International Journal of Advanced Computer Science and Applications*, 8(5), 256-271. <https://dx.doi.org/10.14569/IJAC-SA.2017.080532>
 28. Lishomwa, L., & Phiri, J. (2020). Adoption of internet banking services by corporate customers for forex transactions based on the TRA model. *Open Journal of Business and Management*, 8(1), 329-345. <http://dx.doi.org/10.4236/ojbm.2020.81020>
 29. Liyanaarachchi, G., Deshpande, S., & Weaven, S. (2021). Online banking and privacy: redesigning sales strategy through social exchange. *International Journal of Bank Marketing*, 39(6), 955-983. <https://doi.org/10.1108/IJBM-05-2020-0278>
 30. Masihuddin, M., Khan, B. U. I., Mattoo, M. M. U. I., & Olanrewaju, R. F. (2017). A survey on e-payment systems: elements, adoption, architecture, challenges and security concepts. *Indian Journal of Science and Technology*, 10(20), 1-19. <http://dx.doi.org/10.17485/ijst/2017/v10i20/113930>

31. Mohammed, N., & Faleel, J. (2021). Empirical study on security in online banking in Saudi Arabia. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 18(13), 58-67. Retrieved from <https://archives.palarch.nl/index.php/jae/article/view/8069>
32. Payment channels. (2022). *Introduction about Saudi's Government Payments*. Retrieved from <https://www.my.gov.sa/wps/portal/snp/aboutksa/ePayment/?lang=en>
33. Saparudin, M., Rahayu, A., Hurriyati, R., & Sultan, M. A. (2020). Exploring The Role of Trust in Mobile-Banking Use by Indonesian Customer Using Unified Theory of Acceptance and Usage Technology. *International Journal of Financial Research*, 11(2), 51-60. <https://doi.org/10.5430/ijfr.v11n2p51>
34. Saudi Central Bank. (2022). *Clearing and Payment systems* (Statistical Report). Retrieved from <https://www.sama.gov.sa/en-US/EconomicReports/Pages/report.aspx?cid=116>
35. Saxena, S., Vyas, S., Kumar, B. S., & Gupta, S. (2019). Survey on online electronic payments security. In *2019 Amity International Conference on Artificial Intelligence (AICAI)* (pp. 746-751). IEEE. <https://doi.org/10.1109/AICAI.2019.8701353>
36. Singh, S., & Rana, R. (2017). Study of consumer perception of digital payment mode. *Journal of Internet Banking and Commerce*, 22(3), 1-14. Retrieved from <https://www.icommercecentral.com/open-access/study-of-consumer-perception-of-digital-payment-mode.pdf>
37. Souiden, N., Ladhari, R., & Chaouali, W. (2020). Mobile banking adoption: a systematic review. *International Journal of Bank Marketing*, 39(2) 214-241. <https://doi.org/10.1108/IJBM-04-2020-0182>
38. Srouji, J. (2020). Digital payments, the cashless economy, and financial inclusion in the United Arab Emirates: Why is everyone still transacting in cash? *Journal of Risk and Financial Management*, 13(11), 260. <http://dx.doi.org/10.3390/jrfm13110260>
39. Torki, L., Rezaei, A., & Razmi, S. F. (2020). The Effects of Electronic Payment Systems on the Performance of the Financial Sector in Selected Islamic Countries. *International Journal of Economics and Politics*, 1(1), 113-121. <https://dx.doi.org/10.29252/jep.1.1.113>
40. Walid, A. M., & Sherzad, R. (2020). The impact of using electronic payment methods on transparency and disclosure: Case study Jordanian companies. *Smart Cities and Regional Development (SCRD) Journal*, 4(2), 117-138. Retrieved from <https://ideas.repec.org/a/pop/journl/v4y-2020i2p117-138.html>
41. Wu, J., Jiang, N., Wu, Z., & Jiang, H. (2021). Early warning of risks in cross-border mobile payments. *Procedia Computer Science*, 183, 724-732. <https://doi.org/10.1016/j.procs.2021.02.121>
42. Zamil, A., Abu-ALSondos, I., & Salameh, A. (2020). Encouraging Consumers to Make Online Purchases Using Mobile Applications, How to Keep them in Touch with E-Services Providers? *International Association of Online Engineering*, 14(17), 56-65. <https://doi.org/10.3991/ijim.v14i17.16599>