OPEN ACCESS

Saudi Journal of Business and Management Studies
Abbreviated Key Title: Saudi J Bus Manag Stud
ISSN 2415-6663 (Print) |ISSN 2415-6671 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article

Extending UTAUT for Mobile Payments Adoption in Sudan's Security Crisis *(Redefining System Speed, Political Instability and Illiquidity Influences)*

Nahla Elhag Mohamedin[1], Li Yabing[1]* Kaluba Luboya Jacob[1]
[1]School of Economic and Management, Lanzhou University of Technology, Lanzhou, China

DOI: https://doi.org/10.36348/sjbms.2026.v11i04.003 | **Received:** 09.02.2026 | **Accepted:** 04.04.2026 | **Published:** 13.04.2026

***Corresponding author:** Li Yabing
School of Economic and Management, Lanzhou University of Technology, Lanzhou, China

Abstract

Purpose: This research aims to study the extent of customers' acceptance of mobile payment services in Sudan during the political instability period, and critically analysis the impact of the war and lack of liquidity (cash shortage) on the intention and actual use of service. The study also adapts and extend the UTAUT model by taking into account factors such as system speed, political instability and illiquidity influence. ***Design/Methodology/Approach*:** The study takes a quantitative research technique to evaluate the relationship between many independent and dependent variables. The data have been collected using an online survey, statistical analysis is conducted using the SPSS software and SPSS AMOS 24. ***Findings:*** The empirical findings validate that the intention to use mobile payment systems and their actual usage during the Sudan war crisis is significantly and positively influenced by performance expectancy, effort expectancy, facilitating conditions, political instability influence, and illiquidity influence, while social influence and system speed found to have no significant effect of Sudanese intention to use the mobile payment system during the crisis time. ***Originality/Value*:** The importance of this study stems from the fact that it is one of the first studies to investigate the impact of political instability, and severe cash shortages on consumers' intention to adopt and use mobile payment services, coinciding with the ongoing war in Sudan.

Keywords: Mobile payment, UTAUT, Transection speed, Political instability, Cash shortage, Sudan.

1. INTRODUCTION

Recent advancements in Information and Communication Technology (ICT) have become a key factor of development and are driving growth in both developed and emerging economies (Al-Fraihat *et al.,* 2020). In this regard, online payment services in Sudan have significantly transformed the way that people of Sudan conduct financial transactions by bringing comfort, convenience, and security. For example, Bankak is one of the pioneering payment systems in Sudan, which introduced a digital platform that allows users to use a wide range of banking services online, including money transfers and bill payments. Bankak enables users to perform bill payments and money transfers, with a daily transaction limit of three million Sudanese pounds ($5,000) per customer. As of now, the app boasts seven million users, and its popularity has surged since the outbreak of the war, with an 85% increase in app activations reported by Fadl Mohamed Khair, chair of the bank's board of directors(Covering. & Salih, 2024). On the other hand, O-Cash payment service has also made a significant contribution and provide a mobile money service that enables users to send and receive money instantly, a useful service without needing traditional banking method. Moreover, Fawry payment service also played significant role through offering easy platform for bill payments and other financial services. These services, indeed, have made financial transactions more accessible and played a crucial role in promoting financial inclusion, which allowed more Sudanese people to participate in the digital-based economy(Nanjero & Sossouvi, 2021).

Despite the grow of users and demands, the acceptance and actual usage of mobile payment services are mainly influenced by factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions, as outlined in the Unified Theory of Acceptance and Use of Technology (UTAUT) model(Dwivedi *et al.,* 2019).Moreover, we also introduce three novel factors, including political instability influence, illiquidity influence and system speed. These new factors are added to extend UTAUT model in response to the current political and economic situation in Sudan, especially the current war and lack of liquidity challenges. By exploring the extent of customer acceptance of mobile payment services in Sudan and the impact of war and illiquidity on actual usage. this research seeks to provide a comprehensive understanding of the driving factors for adoption and usage of mobile payment services in instable regions.

We put forward eleven hypotheses that examine the relationships between various factors and the behavioral intention and actual usage of mobile payment systems services. Specifically, these posit that performance expectancy (H1), system speed (H2), effort expectancy (H3), and social influence (H4) positively influence the behavioural intention of customers to use mobile payment services. facilitating conditions (H5, H6) political instability influence (H7, H8), and illiquidity influence (H9, H10). which are expected to significantly influence the behavioural intention and actual usage of mobile payment systems services during the period of political instability. Finally, this research hypothesizes that behavioural intention (H11) can positively impact the actual usage of the services. By addressing these hypotheses, this research topic aims to contribute and enhancing to the current understanding of user adaption behaviour on using mobile payment systems. Furthermore, these findings also offer practical roadmap for developers, policymakers, and financial institutions in order to guide polices and services in future.

2. THE LITERATURE REVIEW HYPOTHESES DEVELOPMENT AND RESEARCH MODEL

2.1 Literature Review

The UTAUT model, which was first suggested by (Venkatesh *et al.,* 2003), was initially used as a conceptual model to investigate how customers perceive the acceptance and usage of mobile payment services during times of crisis. However, in this case study, in addition to behavioural intention and actual use, the UTAUT model was adapted to include the factors System Speed, Political instability influence and illiquidity influence, making it a seven-construct model.

According to the UTAUT model, performance expectancy, effort expectancy, social influence, and facilitating conditions are the four primary elements that affect behavioural intention to use a technology(Okaily *et al.,* 2023). Moreover, Gender, age, experience, and voluntarines of use are the four main moderators that regulate the correlations between these parameters, behaviour intention, and behaviour of use(Venkatesh *et al.,* 2003). Figure (1) depicts the components of the UTAUT model.

The acceptance and use of mobile payment systems during periods of extreme instability, such as war, require integrated theoretical framework combining both technological and behavioral factors. Therefore, two foundational theories can be included in the frame of this study: The Unified Theory of Acceptance and Use of Technology (UTAUT) and the Theory of Planned Behavior (TPB). The TPB suggest that an individual's behavior is linked to their Behavioral Intention, which is also shaped by three principal factors such as attitude toward the behavior, subjective Norms (perceived social pressure), and perceived behavioral control (PBC)(Tenenbaum & Eklund, 2020) . PBC presents the concept that individual's perception of their ability to perform the behavior based on available resources and opportunities (Hagger *et al.,* 2022). In the context of war / crisis time, perceived behavioral control (PBC) means for technology user, the sense of confidence and ability to use digital tools effectively aside from the preserved existing constraints. In this context, PBC project both self-efficacy, external facilitators and barriers such as network access, device availability, and digital literacy(Hou *et al.,* 2022; Sanne and Wiese, 2018). For example, the research on social media usage in terms of information sharing during crisis revealed that, PBC significantly enhances both users' intentions and actual use behaviors to effectively engage with critical updates on platform social media platforms. On the other hand, the ease of use which is another concept from the Technology Acceptance Model (TAM) , also support the influence of PBC on behavioral intentions, particular when users perceive the usefulness of technology in critical times (Malik *et al.,* 2023) PBC also include the concept of easy use which can be very useful to explain the leaning of consumer to use certain technology during crisis time(Hansen *et al.,* 2018). In the context of stable situation performance expectancy, effort expectancy, social influence, and facilitating conditions (or PBC) were found to usually poses significant relationships with Behavioral Intention and Use Behavior(Selvi and Önem, 2025; Tamilmani, Rana and Dwivedi, 2021; Azizi, Roozbahani and Khatony, 2020). Majority of technology adaptation research were performance to study costumer's adaption during politically and economically stable situation, in this case measures such as assumptions of resource availability, institutional support, and user autonomy are for high extend exist. However, during war time or extreme situation, these measures need a second look, especially for parameters like performance expectancy, effort expectancy, social influence, and facilitating Conditions/PBC. In this regard, we noticed a shortage in already established studies addressing this angle. Looking at this gap in

research can help adapting this existing theory to crisis situation and also boost better understanding of technology adoption when stability isn't the option. Herein, and based on Sudan's war context, established adoption theories that were previously implemented require significant reform. For example, in the extreme necessity situation, social influence may become less of a concern, posing weaker significance, in opposite to what UTAUT predicts. By contrast, measures such as perceived behavioral control/facilitating conditions play a significant role, as getting access to a smartphone, power source, and connectivity becomes an absolute requirement rather than mere facilitators for intention or use.

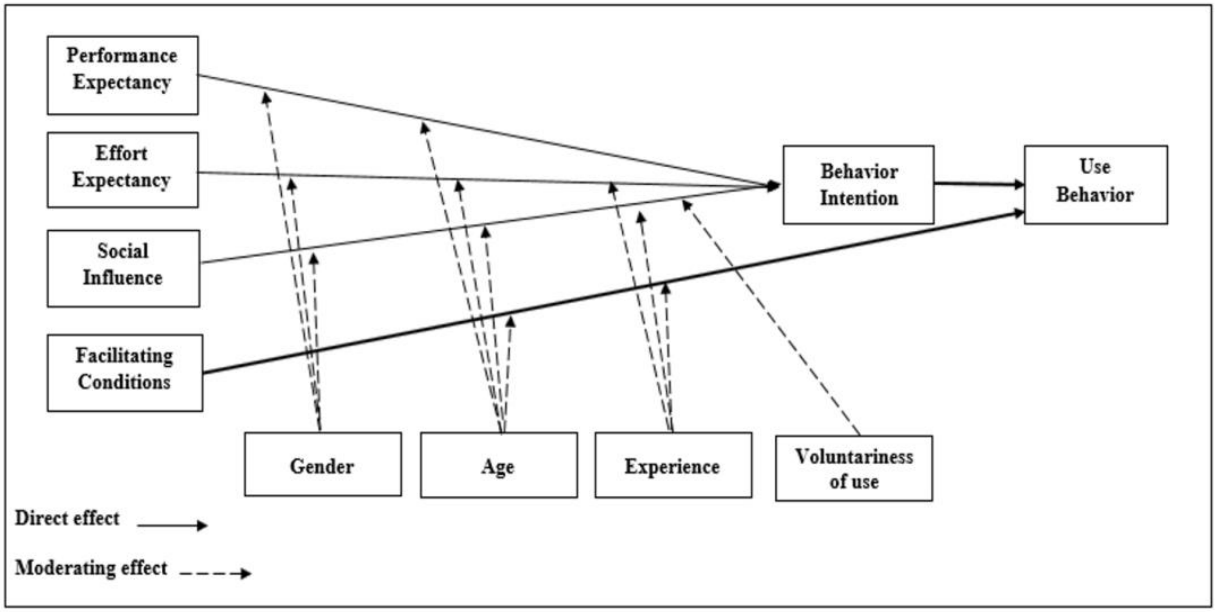

Figure 1: UTAUT model (Venkatesh *et al.*, 2003)

A side from these measures, the war context provides another angle; for example, due to the collapse of financial systems, cash shortages become significant drivers and surpass the importance of traditional predictors. Based on these shifts in adaptation measures, it is of great importance to adapt the current models of technology use, where the extreme need redefines the previously established relationships.

2.2 Hypotheses development

In most study conducted on user's adaption of mobile payment, factors such as user performance expectancy, effort expectancy, social influence, and facilitating conditions are explained in the context of UTAUT during stability time (Ghalandari, 2012). In this regards, UTAUT model can accurately explain the relationship between these factors in order to detect and interpret the user's behavior toward mobile payment adaption(Rahi *et al.,* 2025; Badan and Igeria, 2018). However, during crisis time, the behavior intention and adaptability of users can be significantly altered under the influence of the daring situation. And accordingly, the behavior intentions factors change in responses to the new reality of instability. For example, during a time of cries such as COVID-19 , and based on study conducted on the customer behavior performance expectancy, effort expectancy and perceived severity have a significant positive impact on consumers' attitude, however social influence didn't play significant relationship in regards of customers attitude(Upadhyay *et al.,* 2022). Another study was conducted in order to study the factors that effecting mobile payment in Sri Lanka, revealed that in the time of COVID-19, trust and risk were significant factors for mobile banking usage, while trust positively impacted the relationship, risk negatively impacted(Kumari, 2025). Table (1) shows the summary of previous studies on mobile payment adoption during crisis time. Another angle for evaluating the user behavior during crises was performed by combining both UTATUT with perceived benefits from mental accounting theory (MAT), as a result, technological and mental perceptions, together, were found to influence the user's adoption and intention(Zhao, 2021). Indeed, during crises such health, UTATUT can also be integrated with the health belief model (HBM), resulting in that perceived susceptibility, perceived severity, social influence, performance expectancy, effort expectancy, facilitating conditions, and trust were actually having significant impact on costumers. However, hedonistic motivation did not have significant effect(Mohammed *et al.,* 2025). Based on these given examples, during the time of crisis, costumer's intention can significantly change based on response to the reality of the new situation. This requires, during the war time/political instability, we precept that performance expectancy (PE) can becomes critical, because users may adopt mobile payments when they believe the technology will help to overcome the barriers of financial isolation and

transaction delays during crises. Same way, effort expectancy (EE) may also play important role, since the ease of use determines how users with limited digital knowledge can quickly adapt to online mobile payment platforms during war time. In this track, social influence (SI) also can be vital, for example, trusting peers, family members, and community actors often replace the effect of institutional assurances. During instability, accessing a functioning mobile network, charging facilities, and SIM cards (facilitating conditions (FC)), can also influence the behavior intention, especially when the basic infrastructure is likely unavailable. The context of instability also introduces new factors aside from the conventional UTAUT model. For example, speed of transactions will be a matter of efficiency and safety as well, because the long delays in financial transfer during war may expose users to more risk. We anticipate also that the lack of physical cash and the collapse of traditional banking, can be another key driver in helping the quick adaptation of users to mobile based payment systems. Based on the UTAUT's logic, indeed the behavioral intention is still strong predictor of actual usage. However, in war time the user's intention can be derived by other factors such expectations of technology performance, economic pressures and political uncertainty as well. Therefore, the conceptual model in the current study included system speed, political instability and illiquidity influence as an extension to the UTAUT model as shown in figure (2).

Table 1: Summary of previous studies on mobile payment adoption during crisis time

Author	Theory	Country	Factors	Findings
(Mohammed *et al.,* 2025)	UTAUT2 and HBM	Saudi Arabia	Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Perceived Susceptibility, Perceived Severity, Trust, Uncertainty Avoidance, Behaviour Intention and Use Behaviour.	Adaptation to MPS is significantly influenced by perceived susceptibility, perceived severity, social influence, performance expectancy, effort expectancy, facilitating conditions, and trust. Hedonic motivation has no meaningful impact. Uncertainty avoidance moderates the relationship between user intentions and the actual utilization of MPS.
(Kumari, 2025)	TAM	Sri Lanka	Usefulness, risk, trust, Ease of use and mobile banking usage.	Trust and risk are significant factors affecting mobile banking. Ease of use and Usefulness were irrelevant factors during the COVID-19 pandemic in Sri Lanka.
(Ismael Hashi, 2025)	TAM	Somalia	Financial inclusion, behavioural intention, Attitude, Perceived usefulness and Perceived ease of use.	Behavioral intentions, perceived usefulness, and perceived ease of use significantly influence the adoption of mobile money services among Somali MSMEs. Mobile money has a positive impact on financial inclusion, allowing businesses to engage more actively in the economic ecosystem. The attitude toward financial inclusion shows positive trends, its direct statistical significance was found to be inconclusive.
(Ghandour *et al.,* 2023)	–	United Arab Emirates (UAE)	Mobile Payments Services (MPS), Consumer demand and producer supply before corona and Consumer demand and producer supply after a corona.	Significant relationship between the dependent and independent variables. The MPS industry expanded before and after the pandemic.
(Ajouz *et al.,* 2023)	TPB	Palestine	Beliefs, Attitude, Subjective Norm, Perceived Control, intention to use mobile payment, Accessibility and Availability of financial services and the usage of financial services.	All direct paths within the model were supported. The paths between subjective norm and mobile payment intention are not supported. The proposed model supports the mediation role of attitude, subjective

Author	Theory	Country	Factors	Findings
				norm, and perceived behavioural control between beliefs and mobile payment intention.
(Jayarathne *et al.,* 2022)	UTAUT2	Sri Lanka	Performance expectancy, facilitating conditions, Social influence, Perceived technology security, Hedonic motivation and Adoption of mobile payment.	Performance Expectancy and Facilitating Conditions (PEFC), Hedonic Motivation (HM) and Perceived Technology Security (PTS) as, respectively, significantly motives.
(Al-Qudah *et al.,* 2022)	–	United Arab Emirates (UAE)	Ability to use (skilfulness), Perceived usefulness, Convenience of the system, Perceived risk and Intention to use.	Mobile user skilfulness, perceived usefulness and convenience of the system influence the intention to use. Perceived risk has a weak negative relationship with intention.
(Upadhyay *et al.,* 2022)	TAM, UTAUT and meta-UTAUT	India	Performance expectancy, Effort Expectancy, Social Influence, facilitating conditions, Perceived severity, Self-efficacy, Attitude toward using mobile payment services and Behavioural intentions.	Performance Expectancy, effort expectancy and perceived severity have a significant positive impact on consumers' attitude. Facilitating conditions has a significant positive impact on effort expectancy. Social influence has no significant relationship with attitude.
(Zhao, 2021)	UTAUT and MAT	China	Performance Expectancy, Effort Expectancy, Social Influence, Perceived benefits, Perceived Security, Trust and behavioural Intention	The users' technological and mental perceptions both influence adoption intentions of M-payment. Perceived benefits determined by social influence and trust.
(Al-Sharafi *et al.,* 2022)	PMT and ECM	Malaysia	Perceived severity, Perceived vulnerability, Self-efficacy, Response efficacy, Response costs, Perceived usefulness, Expectation confirmation, Satisfaction, Sustainability and Perceived trust.	PT has the largest impact on the sustainable use of mobile payment contactless technologies. Self-efficacy (SE) (77%), satisfaction (72.1%), perceived vulnerability (PV) (48.9%), perceived usefulness (PU) (48.2%), perceived severity (PS) (40.7%), response efficacy (RE) (28.7%) and response costs (RCs) (24.1%).
(Daragmeh *et al.,* 2021)	TRA, TAM, TPB and IDT	Hungary	Subjective Norm, Perceived Ease of Use, Perceived Usefulness, Perceived COVID-19 Risk and Behavioural Intention.	perceived COVID-19 risk, perceived usefulness, and subjective norms significantly influence Hungarian Generation X's behavioural intentions to use mobile payment services. perceived usefulness mediates the relationship between perceived ease of use and behavioural intention to use mobile payment systems.
(C.C & Prathap, 2020)	HBM and ECM	India	Perceived susceptibility, Perceived severity, Confirmation, Perceived usefulness, Satisfaction, Continuance intention and Self-efficacy.	HBM constructs, perceived severity, perceived susceptibility. Self-efficacy significantly influenced adoption/confirmation of mobile-based payment services. Continuance intention significantly predicted by perceived usefulness and perceived satisfaction. Perceived health threat indirectly affects continuance intention through

Author	Theory	Country	Factors	Findings
				confirmation, perceived usefulness and satisfaction.
(Oyefolahan *et al.,* 2014)	TAM	Somaliland	Perceived Ease of Use, Perceived Usefulness, Perceived Trust and Behavioral Intention.	Perceived Ease of Use, Perceived Usefulness, Perceived Trust had statistically significant and positive influence on behavioral Intention.
(A. Y. S. Ali & Dhaha, 2014)	TAM	Somalia	Perceived usefulness, Perceived ease of use, Perceived trust, Perceived risk and behavioural intention.	Perceived usefulness perceived ease of use and perceived trust had statistically significant and positive effect on intention to adopt EVC Plus among students. Perceived risk was not a predictor of intention to use EVC Plus. Perceived ease of use was found to be a predictor of perceived usefulness to use EVC Plus among the students.
(Sayid *et al.,* 2012)	TAM	Somalia	Perceived ease of use, Security, Perceived risk, Perceived usefulness, Social influence, Attitude and adoption intention.	Perceived ease of use has a significant positive influence on the perceived usefulness of mobile money. Perceived usefulness and security were found to have a significant positive influence on attitude. Social influence together with perceived usefulness both have significant positive influence on the Somali customers' intention to adopt mobile money.

2.3 Hypotheses formulation.

This section seeks to formulate hypotheses that investigate the relationship and inter-dependencies among the variables within the proposed framework.

2.3.1 Performance expectancy (PE)

According to the UTAUT model, performance expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance"(Venkatesh *et al.,* 2003).

Based on the UTAUT model, the study assesses the extent of the impact of the perceived benefit of using the mobile payment service provided by mobile payment system providers (Banks) based on of customers intuition, and help them harness benefits such as convenience, speed and efficiency. A previous study conducted to evaluate mobile payment adoption in Sudan confirmed that performance expectancy positively and significantly affects the behavioural intention and that if Sudanese people are not fully aware of the usefulness of using mobile payments, they will not be inclined to use this service(Abubker *et al.,* 2021). On the other hand, results of another studies(Al-Qudah *et al.,* 2022; Al-Sharafi *et al.,* 2022; A. Y. S. Ali & Dhaha, 2014; Ismael Hashi, 2025; Jayarathne *et al.,* 2022; Mohammed *et al.,* 2025; Upadhyay *et al.,* 2022; Zhao, 2021)indicated that performance expectancy (perceived usefulness) is the strongest predictor for the intention to use mobile payment. While results of a study conducted by (Kumari, 2025)showed that usefulness is not identified as one of the significant factors contributing to the adoption and usage of mobile banking services in Sri Lanka during Covid-19. Accordingly, and based on the above discussion, our study proposes the following hypothesis:

H1. Performance expectancy can positively and strongly influence behavioural intention of costumer to use mobile payment services in Sudan during war time.

2.3.2 System speed (SS)

Expanding the scope of the performance expectancy, in addition to determining whether mobile payment services providers should concentrate on enhancing system speed and investing in fortifying infrastructure to ensure minimal delays in transactions in order to attract and retain customers, we also assess whether user satisfaction and, consequently, their intention to adopt and continue using the service, are significantly impacted by transaction processing speed and system responsiveness. Over the past years, research has consistently proved that faster speeds in mobile payments, and banking is considered as more practical and effective factor, which directly promotes the use and reinforces behavioural intention. According to(Abadzhmarinova & Hedman, 2014; Carlsson *et al.,* 2006; Chen & Nath, 2008; Pagani, 2004; Teo *et al.,* 2015; Yang & Jolly, 2009)transaction and data transfer speed are key factors impacting and influence the

adoption and use of mobile services. Therefore, the system transaction speed factor is added to the model. The speed factor means mobile payment system transaction positively affects the behavioural intention of customers. If the online payment perceived as fast and efficient, customers will have positive attitude towards it. Moreover, transection speed play important role where mobile payment systems are still new service. Generally, customers in developing markets value dependability and efficiency when making financial transactions. Consequently, the research suggests the following:

H2. System Speed of transaction positively influences the behavioural intention of the customer to use mobile payment systems services in Sudan during war time.

2.3.3 Effort expectancy (EE)

Effort expectancy is defined as the degree of ease associated with the use of the system (Venkatesh *et al.,* 2003). This construct is formed of three determinants: "perceived ease of use," "complexity" and "ease of use"(Venkatesh *et al.,* 2003). To ensure the success of mobile payment systems, providers and developers must focus on its ease of use. When clear instructions, tutorials and customer support are provided, this will lead to reduce perceived effort and also enhance adoption. In this concern, several studies (A. Y. S. Ali & Dhaha, 2014; Ismael Hashi, 2025; Mohammed *et al.,* 2025; Upadhyay *et al.,* 2022) confirmed that effort expectancy (ease of use) can positively influence the users attitude to adapt mobile payment services. However, (Kumari, 2025; Zhao, 2021) argue that there is no significant relationship between effort expectancy and the intention to use the mobile payment service. The study addresses the extent to which customers perceive that mobile payment systems are easy to use and requires least effort, and whether it can help them form strong intention to adopt and use. Based on the previous this study proposes the following:

H3. Effort expectancy positively and strongly influences behavioural intention of costumer to use mobile payment services in Sudan during war time.

2.3.4 Social influence (SI)

The degree to which an individual perceives others should use the new system is defined as social influence(Venkatesh *et al.,* 2003). In this case, the three items that represent social influence in UTAUT are subjective norms, social factors and image(Venkatesh *et al.,* 2003).

Social influence usually triggered by family membrane, friends, colleagues and societal norms. These three factors play an important role in forming the intention and influence customers decisions, especially in the context of adopting new technologies or services such as mobile payment. According to (Mohammed *et al.,* 2025; Sayid *et al.,* 2012; Zhao, 2021) social influence found to be a significant predictor of behavioural intentions. while social influence is not a significant motive in(Jayarathne *et al.,* 2022; Upadhyay *et al.,* 2022) to adopt the mobile payment service. Indeed, this study examines whether social influence has a strong role in the acceptance and use of mobile payment systems services in Sudan, accordingly, we propose the following:

H4. Social influence positively influences the behavioural intention of costumer to use mobile payment services in Sudan during war time.

2.3.5 Facilitating condition (FC)

Facilitating conditions are defined as the extent to which an individual believes that technical and organizational infrastructures are in place to support the use of the system(Venkatesh *et al.,* 2012). (Abubker *et al.,* 2021; Asampana, 2022; Jayarathne *et al.,* 2022; Lin *et al.,* 2020; Mohammed *et al.,* 2025; Ponsree & Naruetharadhol, 2025; Upadhyay *et al.,* 2022) identified facilitating conditions as significant factor influencing user's intention to adopt the mobile payment service in Saudi Arabia, Sri Lanka, India, Ghana, Sudan and Taiwan. while(Alkhwaldi *et al.,* 2024; Migliore *et al.,* 2022; Okaily *et al.,* 2023) posited facilitating conditions as an insignificant factor in Jordan and Italy. Based on these points the study suggests that the availability of resources, knowledge and support such as technical assistance and internet access will have a positive impact on their behavioural intentions to use the mobile payment services. Accordingly, the customers intention and actual use will be affected. Therefore, we propose the following:

H 5. Facilitating condition positively influences behavioural initiation of costumer to use mobile payment services in Sudan during war time.

H6. Facilitating condition positively and significantly influence the actual usage of costumers to use mobile payment services in Sudan during war time.

2.3.6 Political Instability (PI)

Political influence "war influence" in the context of this study is political instability. The behavioural intention and actual usage of the mobile payment service may be significantly impacted during the current war situation in Sudan. In such areas, the traditional banking systems could be highly unreliable, which will lead the population to go with alternative financial solutions such as mobile payment services, in order to guarantee the service continuity. For the case of current war in Sudan, mobile payment services have emerged as the most widely used and dependable alternative to traditional way of making transactions. Thus, this study's primary goal is to determine the true effect that Sudan's security instability has had on the acceptance of mobile payment services. Consequently, the research suggests the following:

H7. Political instability influence "war" positively influences behavioural initiation of costumer to use mobile payment services in Sudan.

H8. Political influence "war" positively and significantly influences the actual usage of costumers to use mobile payment services in Sudan.

2.3.7 Illiquidity influence (II)

In this regard, Illiquidity refers to cash shortage.(Judson, 2024) define cash shortage as situation where the physical currency available to households, businesses, and banks is insufficient for demand in cash. Meanwhile(Conway, 1994) definition is a state when people deposited savings in banks are unavailable for withdraw as banknotes.

The ongoing war in Sudan is considered as major factor that induced the adoption of mobile payment services after the complete destruction of Sudan's underdeveloped traditional banking infrastructure, which rendered it inaccessible to many. This was primarily because of the lack of cash liquidity, which made it difficult for bank's customers to access cash and traditional banking services. In this case, people may use mobile payment systems as practical and accessible option if they face cash shortage or traditional banking services shutdown.

Based on reports(Aquilla, 2025; WAGNER, 2025) the lack of cash has played a significant role in influencing users' intentions to adopt mobile payment services in, Sudan and South Sudan. Consequently, the research suggests the following:

H9. Illiquidity positively and significantly influences the actual usage of costumers to use mobile payment services in Sudan during war time.

H10. Illiquidity positively and significantly influences the actual usage of costumer to use mobile payment services in Sudan during war time.

2.3.8 Behavioural intention (BI)

Behavioural intention (BI) defined as the degree to which a user's motivation intends to adopt and use a new mobile payment system(Robert M Davis, Duane, 1995).One of the most crucial goals of this study is to determine the extent to which customers plan or intend to continue use mobile payment services in the future because their behavioural intention which triggered during the war time. In this regard, their planned or intended use of the service has a direct, positive, and significant impact on their actual use of the service; in other words, if customers intend to use a mobile payment service during this critical time of instability, they are more likely to actually use it in practice. Therefore, the study suggests:

H11. The behaviour intention of users is positively associated with their actual use e of mobile payment service in Sudan during war time.

2.4 Research Model

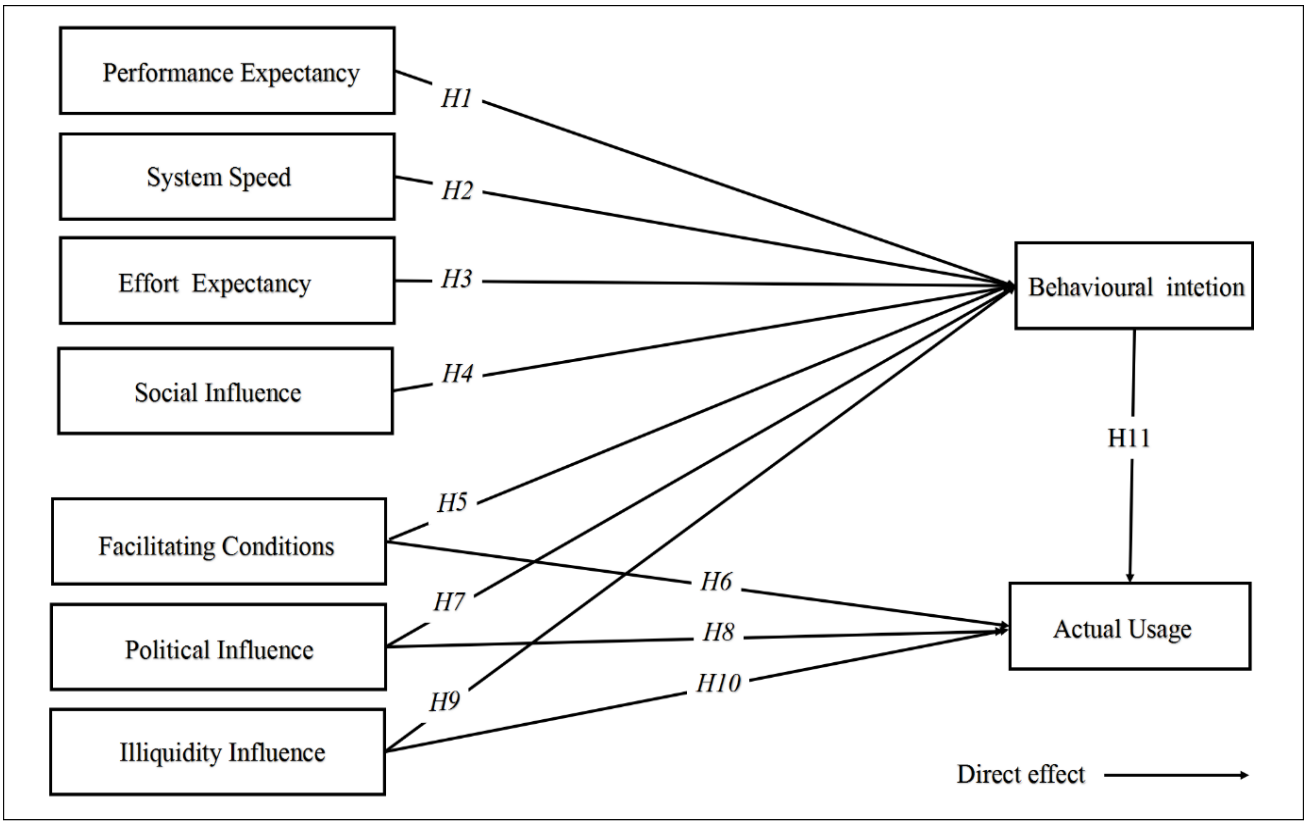

Figure 2: The research model

3. RESEARCH METHODOLOGY AND DATA COLLECTION

The study adopted a quantitative research approach to investigate the relationship between several independent variables (performance expectancy, effort expectancy, social influence, facilitating conditions, system speed, political instability influence and illiquidity influence) in addition to behavioural intention and actual usage (dependent variable) of customers of the mobile payment services in Sudan. The current study's data was gathered from consumers of the most popular mobile payment platforms, i.e., Bankak, Fawry , O-cash , Salam Mobile, Syber-Pay and Nile bank in Sudan via online questionnaire was designed and shared via an online Google Forms link(Upadhyay *et al.,* 2022) For this instance, Google Forms can be highly flexible and convenient to smoothly obtain responses(Evans & Mathur, 2018), to examine the behavioural intention and actual usage of mobile payment services customers. Arabic had been used as the native language of the Sudanese, where extensive verification and translation will take place prior to data collection. Random samples had been taken from customers residing inside Sudan during the war period (101, 32.6%) as well as customers residing outside Sudan (209,67.4%) who witnessed the initial period of the war. A total of 547 surveys were collected online at random among different Sudanese students, employed and self-employed. For the purpose of this research, we have received 310 positive responses from mobile payment active users. The collected positive response was finalized and validated for the statistical analysis, having a response rate of 43.5% (135 females) and 56% (175 males). Accordingly, the sample size was considered enough to generate reliable findings based on the research assumptions. The age range of participants falls between 18 and 55 years old. Primarily, statistical information is shown in Table (2). Statistical tests and data screening were performed by using IBM SPSS Statistics software, version 25. Moreover, data analysis and hypothesis testing were performed by using the software package of SPSS AMOS 24. All the constructs were measured with three to six items, and a five-point Likert scale was used with options ranging from "1 = strongly disagree" to "5 = strongly agree.". The elements of the study were modified to fit the current research in the mobile payment context in Sudan during the political instability period, which took around three months between March 2025 and June 2025. The employed questionnaire is as shown in the Table (3).

Table 2: Demographic data, N=310

		Female (N=135) 43.5%		Male (N=175) 56.5%	
		Count	**Column, N %**	**Count**	**Column, N %**
Age	18-24	19	14.1%	34	19.4%
	25-34	86	63.7%	61	34.9%
	35-44	17	12.6%	41	23.4%
	45-54	10	7.4%	20	11.4%
	+55	3	2.2%	19	10.9%
Education	Primary school	1	0.7%	0	0.0%
	High school	4	3.0%	7	4.0%
	Diploma	1	0.7%	2	1.1%
	Bachelor	93	68.9%	110	62.9%
	Master	31	23.0%	39	22.3%
	PHD	5	3.7%	17	9.7%
Occupation	Employed	71	52.6%	99	56.6%
	Self-employed	25	18.5%	26	14.9%
	Unemployed	4	3.0%	2	1.1%
	Student	27	20.0%	48	27.4%
	Housewife	8	5.9%	0	0.0%
Previous mobile payment	Bankak	122	90.4%	154	88.0%
	Fawry	4	3.0%	6	3.4%
	Nile Bank	0	0.0%	1	0.6%
	O-cash	4	3.0%	5	2.9%
	Salam Mobile	2	1.5%	1	0.6%
	Syber Pay	1	0.7%	0	0.0%
	All*	2	1.5%	8	4.6%

*All= the participance uses multiple mobile payment systems (Bankak, O-cash, Fawry).

Table 3: The study measurement

Items	Study measurement	Sources
	Performance Expectancy	
PE1	Using mobile payment services will help me make payments faster.	(Venkatesh *et al.,* 2012)
PE2	I will save time by using mobile payment services.	
PE3	Using mobile payment services will improve my efficiency in managing my finances.	
PE4	I find mobile payment services useful in making payments in my daily life.	
PE5	Using mobile payment services would enhance my overall payment experience.	
	Effort Expectancy	
EE1	Learning to use mobile payment systems will be easy for me.	(Venkatesh *et al.,* 2012)
EE2	I find mobile payment systems easy to use.	
EE3	It will be easy for me to become skilled in using mobile payment systems.	
EE4	My interaction with mobile payment systems is clear and understandable.	
	Social Influence	
SI1	People who are important to me think I should use mobile payment services.	(Venkatesh *et al.,* 2012)
SI2	People who influence my behaviour think I should use mobile payment services.	
SI3	People whose opinions I value prefer that I use mobile payment services.	
	Facilitating Condition	
FC3	The payment system I use is compatible with other systems I use.	(Venkatesh *et al.,* 2012)
FC4	I can get help from others when I have difficulties using the system.	
	System Speed	
SS1	The payment system I use processes payments quickly.	(Chen & Nath, 2008)
SS2	The speed of my system makes it more attractive to use.	
SS3	I am satisfied with the speed of transactions provided by my payment system.	
	Political Influence (War)	
PI1	The current political situation (war) encourages me to use mobile payment systems.	
PI3	I use the mobile payment service because it is a safe way to transfer money during the war.	
PI4	I use the mobile payment service because it is difficult for me to access traditional banks during the war.	
PI5	The political instability in Sudan has increased my reliance on mobile payment systems.	
	Illiquidity Influence	
II1	Lack of cash encourages me to use mobile payment systems.	
II2	I use mobile payment systems because they help me overcome the lack of cash.	
II3	Lack of cash has made mobile payment systems more attractive.	
	Behavioural Intention	
BI1	I will use mobile payment services for my future payment needs.	(Venkatesh *et al.,* 2012)
BI2	I plan to use mobile payment services regularly to make my payments.	
BI3	I would recommend others to use mobile payment services in Sudan.	
	Actual Usage	
AU1	I rely on mobile payment service for most of my financial transactions.	(Ponsree & Naruetharadhol, 2025) (Jayarathne *et al.,* 2022)
AU2	During periods of political instability (war), I use mobile payment services more frequently.	
AU3	The shortage of cash in Sudan has increased my use of mobile phone payment services.	

4. RESEARCH RESULTS

4.1 PLS-SEM measurement (outer) model

The first and necessary step before producing findings in PLS is the evaluation of the measurement model. It evaluates the validity and reliability of the measurements. Depending on whether the measurement model incorporates formative or reflective measures, the evaluation of the model in PLS-SEM differs(S. Davcik, 2014; Hair, Ringle and Sarstedt, 2011; Ketchen, 2013; Hair, Ringle and Sarstedt, 2013). Accordingly, the validity and reliability of the measurement must be examined before it can be applied to hypothesis testing(A. Ali *et al.,* 2015).

4.1.1 Exploratory Factor Analysis

To investigate the underlying factor structure of the following: performance expectancy, effort expectancy, social influence, facilitating condition, system speed, political influence, illiquidity influence, behavioural intention and actual usage, an Exploratory

Factor Analysis (EFA) was carried out using SPSS version 25. The initial EFA used Principal Component Analysis with Promax rotation (kappa = 4), which is an oblique rotation appropriate for situations where factors are theorized to be correlated. Six items FC1, FC2, PI2, AU4, AU5 and AU6 were removed due to cross-loadings. And the result of all factors loading are showed in Table (4).

4.1.2 Convergent Validity

Convergent validity usually defined as "the extent to which a measure correlates positively with alternative measures of the same construct" (Hair *et al.,* 2013). The indicator reliability in this case is recommended to be above 0.70, moreover, the internal consistence reliability measured based on Cronbach's alpha and composite reliability (CR), (≥0.70). The average variance extracted (AVE) was measured (≥0.50)(Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, 2010; Ketchen, 2013; Sekaran and Bougie, 2009). Accordingly, the result of the Alpha coefficient, CR and AVE are showed in Table (4). All the results were acceptable and within the recommended range. Therefore, it can be concluded that all constructs are suitable for further analysis.

Table 4: Convergent validity-item loading, Cronbach's alpha, composite reliability and AVE

Construct name	Item name	Item Loading	Cronbach's alpha	CR	AVE
Performance Expectancy	PE1	0.899	0.945	0.944	0.772
	PE2	0.976			
	PE3	0.824			
	PE4	0.850			
	PE5	0.835			
Effort Expectancy	EE1	0.886	0.960	0.939	0.796
	EE2	0.895			
	EE3	0.930			
	EE4	0.855			
Social Influence	SI1	0.871	0.930	0.929	0.816
	SI2	0.950			
	SI3	0.886			
Facilitating Condition	FC3	0.804	0.807	0.862	0.758
	FC4	0.932			
System Speed	SS1	0.891	0.921	0.939	0.839
	SS2	0.879			
	SS3	0.974			
Political Influence	PI1	0.685	0.903	0.893	0.677
	PI3	0.863			
	PI4	0.856			
	PI5	0.872			
Illiquidity Influence	II1	0.686	0.951	0.827	0.616
	II2	0.789			
	II3	0.869			
Behavioural Intention	BI1	0.753	0.950	0.858	0.669
	BI2	0.844			
	BI3	0.854			
Actual Usage	AU1	0.889	0.909	0.864	0.680
	AU2	0.838			
	AU3	0.741			

4.1.3 Discriminant Validity

Discriminant validity, defined as "the extent to which a construct is truly distinct from other constructs by empirical standards"(Ketchen, 2013).It's usually evaluated based on that the construct's Average Variance Extracted (AVE) bigger than the highest squared correlation (Hair *et al.,* 2011). AVR is measured based on cross-loadings approach, the Fornell-Larcker method, or the more contemporary Heterotrait-Monotrait (HTMT) ratio of correlations method(Modeling *et al.,* 2015). HTMT criterion recently used by comparing its value to a predefined threshold, value ≥ 1 the suggested threshold of 0.85 (Modeling *et al.,* 2015) indicating a lack of discriminant validity; although it shows high sensitivity and specificity, but still need empirical validity (Criterion, 2024). As in Table (5), all results are within the acceptable range(Modeling *et al.,* 2015; Criterion, 2024).

Table 5: Discriminant Validity – HTMT correlation matrix

	PE	EE	SI	FC	SS	PI	II	BI	AU
PE	-								
EE	0.764	-							
SI	0.566	0.653	-						
FC	0.614	0.743	0.643	-					
SS	0.464	0.516	0.542	0.645	-				
PI	0.700	0.767	0.656	0.663	0.562	-			
II	0.638	0.763	0.613	0.618	0.503	0.873	-		
BI	0.713	0.795	0.659	0.734	0.546	0.853	0.854	-	
AU	0.645	0.774	0.649	0.723	0.552	0.858	0.864	0.859	-

In short, the analyses and results discussed in this section provide a solid piece of evidence that supports all reflective measurements and soundness of the measurement in the path model. In addition, several statistical analyses in this section confirm the measurement models in this study. Accordingly, it can be concluded that the proposed path model has a satisfactory level of validity and reliability. Therefore, the research can safely move toward the structural model analysis and test the proposed hypotheses.

4.2 PLS-SEM structural (inner) model

After confirming the model reliability and validity based on PLS-SEM analysis, testing the proposed hypotheses is the following step. This stage evaluates the strength, direction, and significance of constructs relationship, draw the hypothesis validity. In regard to of evaluating the measurement model, we used confirmatory factor analysis (CFA) to determine if the model fit index is good, accordingly, the model demonstrated a good fit to the data as indicated in Table (6). Based on Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lowis Index (TLI), Normal Fit Index (NFI), Goodness-of-Fit Index (GFI) and Adjusted GFI(AGFI), all fit indexes were significant and acceptable, and can also help in testing null hypotheses. Thus, to know the main effect model and assessing the significance level of the (path co-efficient -β), the direct relationships were tested by PLS using SPSS AMOS 24. The results are presented in Table (7) and Figure (3). In terms of the structural paths, the results of both standardised path coefficients and their significant values were used for hypotheses testing.

Table 6: Confirmatory Factor Analysis CFA

CMIN	DF	CMIN/DF	GFI	AGFI	NFI	TLI	CFI	RMSEA
6.796	4	1.699	.995	.946	.997	.989	.999	.048

Table 7: Result of hypotheses testing (path co-efficient -β) of the study

No.	Relationship IV → DV	Standard beta	Standard error	t-value	p-value	Sig.	Decision
H1	PE → BI	.114	.041	2.740	.006	Sig+	Supported
H4	SI → BI	.060	.032	1.570	.116	N. S	Not supported
H2	SS → BI	.011	.028	.322	.747	N. S	Not supported
H3	EE → BI	.129	.050	2.548	.011	Sig+	Supported
H9	II → BI	.365	.048	7.302	.000	Sig+	Supported
H7	PI → BI	.207	.055	4.028	.001	Sig+	Supported
H5	FC → BI	.143	.033	3.615	.000	Sig+	Supported
H11	BI → AU	.279	.060	4.747	.000	Sig+	Supported
H6	FC → AU	.154	.033	3.968	.001	Sig+	Supported
H8	PI → AU	.148	.059	2.682	.007	Sig+	Supported
H10	II → AU	.374	.056	6.518	.000	Sig+	Supported

Table (7) and Figure (3) presents a summary of the result of hypotheses testing (path coefficients-β) of the research hypotheses. The results mainly show that behavioural intention to use mobile payment system during the political instability in Sudan is significantly and positively influenced by Performance Expectancy, Effort Expectancy, Facilitating Condition, Political Influence, and Illiquidity Influence. Further, Facilitating Condition, Political Influence, Illiquidity Influence are positively and significantly associated with the Actual Usage, Besides, Behavioural Intention to use is significantly correlated with the Actual Usage of mobile payment. Illiquidity Influence is the most influential driver of using mobile payment system services acceptance during political instability period with (T-value: 7.302, P-value: 0.000). Based on that, all related hypotheses were supported. Conversely, the results show that insignificant relationships between Social Influence and System Speed on Behavioural Intention to use

mobile payment system services and hence the related hypotheses were not supported.

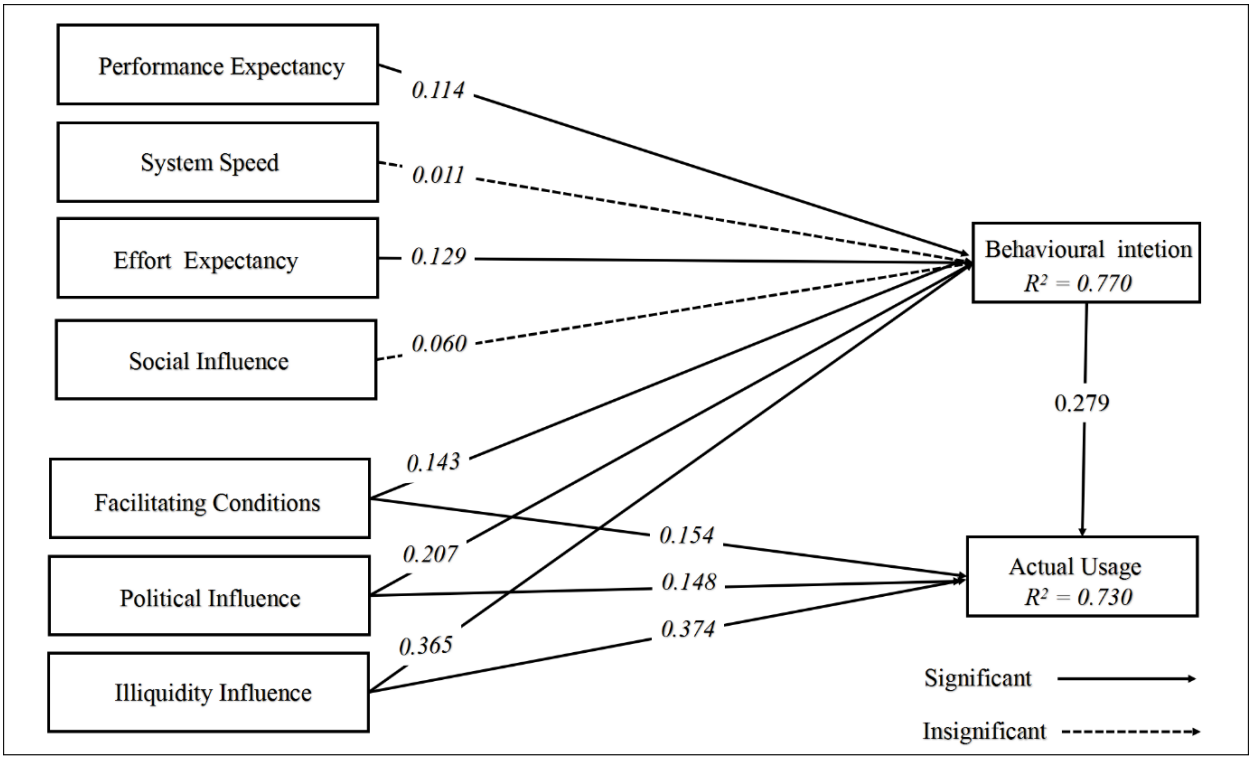

Figure 3: Research model results (β, R2)

5. DISCUSSION

As expected, performance expectancy, effort expectancy and facilitating condition were found to have a significant impact on the Sudanese Intentions to use the mobile payment system services during the period of Sudan's war. This result aligns with the work conducted by(Venkatesh *et al.,* 2003; Venkatesh, Thong and Xu, 2012; Mohammed *et al.,* 2025; Abubker *et al.,* 2021; Migliore *et al.,* 2022; Chaveesuk, Khalid and Chaiyasoonthorn, 2021) which states that performance expectancy, effort expectancy and facilitating condition as the direct determinants of a user's tendency to adopt any new technology.

According to the relationship between performance expectancy (PE) and behavioural intention, the usage of mobile payments is a highly relevant factor for Sudanese users during the war. Performance expectancy, which reflects the customers' need to conduct quick and smooth transactions(Esawe, 2022), confirms that users still recognize this utility, but the low beta value (.114) shows that this aspect is still secondary compared to the compulsory need created by the liquidity crisis. In fact, cash shortage directed the intention adaption, while performance expectancy reflected the logical acknowledgment of the benefit of the mobile payment in the current situation(Malarvizhi *et al.,* 2022).

We also confirm that there is a strong statistically significant relationship between effort expectancy (EE) and behaviour intention to use mobile payment services in Sudan during a period of political instability with statistical values of standard beta, T-value, and p-value. 0.129, 2.548, and 0.011, respectively. Effort expectancy (EE) in our case study was found to have a modest influence, statistically, on behavioural intention (BI) for adapting mobile payment systems during war time (β = 0.129, p = 0.011). Though, in unstable situation EE was found to have significant influence of BI(Mensah & Khan, 2024). That means though EE contributed positively to mobile payment adoption, cash illiquidity indeed overwhelmingly has greater influence (β = 0.365). This also indicates that users can still value the utility of systems that are easy to use and navigate(Abikari *et al.,* 2023). Moreover, EE's modest effect reflects that the need for convenience outweighed the convenience, which means users are willing to overlook complexity, inefficiency, or frustration as long as the system can fulfil their need for financial access(Yan *et al.,* 2023). For sure, the finding in regard to EE shows that in crisis time, the usability becomes more of a supportive but non-dominant factor and functions better as a facilitator of adoption rather than a decisive driver.

Unlike conventional cases where Facilitating Conditions (FC) usually means technical assistance or institutional support, in the scope of this study, FC represents basic hardware tools such as access to a smart functioning device, network connectivity, electricity for charging, and the ability to obtain SIM card(Chawla and

Joshi, 2019; Shaikh and Karjaluoto, 2015). Due to these factors, FC was found to play a statistically significant role in shaping both behavioural intention (β = 0.143, p = 0.000) and actual usage (β = 0.154, p = 0.001). In fact, the strong correlation between FC and actual usage indicates that, though the main driver for mobile payment use is cash shortage, without these facilities, the whole process would have been impossible(Donner & Tellez, 2008). Compared to illiquidity influence (β = 0.365), FC has a modest effect, indicating that necessity is still the dominant driver, but at the same time, FC is yet critical to determine whether necessity can be translated into behaviour. Therefore, our study uniquely explains that illiquidity means people's motivation to adapt, while FC shows how adoption could actually occur. Indeed, adoption depends not only on motivation but also on the practical availability of enabling conditions(Jack & Suri, 2011).

With regard to the relationship between system speed political instability influence and illiquidity influence (cash-shortage) with the behavioural intention and actual use of mobile payment system, this study hypothesised that system speed, political influence and illiquidity influence would have a significant influence on the intention to adopted and use mobile payment system. In this concern, it is highly plausible that in the time of crisis users intend to shift to cash less based transaction(Graziano *et al.,* 2024).

The results indicate that there is a significant relationship between political influence and illiquidity influence on Sudanese users to adopt and use mobile payment system services during political instability. Accordingly, based the findings in this study, political instability (PI) statistically has significant effect on both behavioural intention and actual usage of mobile payment systems. In the context of (UTAUT) framework, political instability works as supporting factor that strengthens performance expectancy and facilitating conditions, therefore users refer to mobile payment services as practical way to overcoming cash shortages, restricted banking operations, and insecurity in conflict zones. This indeed aligns with the concept of crises motivated models which suggest that external shocks can act as catalysts for technology adaptation in which survival and necessity dominate in overall situation. This conclusion indeed supported by previous cases, where instability as factor led to shift in population mindset toward the use of mobile based payments system(Date, 2011). For example, political instability accelerated mobile financial service usage in both cases of Somalia and Democratic Republic of Congo, where populations turned to more accessible methods in order to complete transactions(Aker and Mbiti, 2010; Jack and Suri, 2014). These cross broader and common experiences show that during political instability, the use of online payment become viable and highly possible solution to provide stable and continues financial services in the absence of conventional systems such as banks, and cash became a hard reaching option. In this regard, the study identified illiquidity influence, which caused by the severe cash shortage and banking collapse due to war situations—as the one of main driver of mobile payment adoption. This is supported by significant statistics value of beta: .365/.374, and p: .000, accordingly, these findings demonstrate that extreme necessity shadow all conventional adoption factors. Indeed in crise time mobile payments transformed from a convenience into an essential tool for survival, shifting adoption from choice to essential(Dafri & Al-Qaruty, 2023). As the cash crisis intensify, it directly fuels both the intention to use and actual usage of mobile services. This indeed the case of a crisis-driven adoption leading the technology to become a viable option in hand and overshadow metrics such as performance and social concerns.

Unexpectedly, the study findings reveal that insignificant relationship between social Influence SI and intention to use mobile payment system during the period of war, These findings are consistent with some previous findings of other studies(Venkatesh *et al.,* 2003; Chaveesuk, Khalid and Chaiyasoonthorn, 2021; Upadhyay *et al.,* 2022; Ponsree and Naruetharadhol, 2025). The lack of a significant relationship between social influence and behavioural intention in this context suggests that during extreme political instability and crisis, the traditional drivers for technology adoption are highly influenced by factors such as urgency, personal need, and survival necessity. In this case, social influence loses its power when the primary concerns are immediate safety, absolute necessity, and severe constraints in resources. In a war times, the need of a technology becomes the ultimate factor. Therefore, the choice of using a payment technology is likely not driven by personal or family suggestion. Based on the results, we found that the p-value of 0.116 is very close to the common significance threshold of 0.05. This suggests there might be a minor relationship, but these constrains have played significant role in our current study. Several researches have refuted the impact of social influence, including its proxies such as subjective norms, on consumers' intentions to adopt technology(Alalwan, Dwivedi and Rana, 2017; Riffai, Grant and Edgar, 2012; Gerrard and Barton Cunningham, 2003). Moreover, we find other insignificant relationship between system speed SS and intention to use mobile payment system service during the crisis time , that mean in unstable situations such as time of conflicts, the benchmark for technology can significantly shift from performance to just user functionality, here the necessity essentially relay on the process not features(Abrahim Sleiman *et al.,* 2023; Reuter and Kaufhold, 2018). In this regard, the collapse of alternatives options such as banks, empty ATMs, and dangerous physical travel, makes mobile payments the most in hand option, pushing users to ignore features such as speed. Moreover, severe infrastructure damage can mean that poor speed is an all-costumers experience, leaving no notable difference in

speed that meaningfully influence the intention(Tan *et al.,* 2019). In this case, the link between the relation is mainly based on the perceived necessity, which represented in the need to send/receive for survival, completely overshadows any performance metrics, and make the successful completion of a transaction is mostly prioritized.

6. CONCLUSION

To sum up, the proposed model was tested based on the data collected from the 310 Sudanese user. The results of PLS-SEM analysis have been presented in relation to the different relationships among seven exogenous variables (e.g., performance expectancy, effort expectancy, social influence, facilitating conditions, political instability influence, illiquidity influence and system speed) and two endogenous variables (e.g., behavioural intention and actual usage of mobile payment system). While the empirical results confirmed that behavioural intention to use mobile payment system and the actual use of it during the crisis of Sudan war is significantly and positively influenced by performance expectancy, effort expectancy facilitating conditions, political instability influence and illiquidity influence. It is also worth mentioning that the integrated model of this study can explain approximately 77% of the variance in the behavioural intention and 73% of the variance in the actual usage of mobile payment system during the crisis time in Sudan.

REFERENCES

- Abadzhmarinova, R. S., & Hedman, J. (2014). Exploring the effect of speed of purchase on consumers ' intention to adopt NFC mobile payments Program : MSc in Service Management. *Copenhagen Business School*, *825*.
- Abikari, M., Öhman, P., & Yazdanfar, D. (2023). Negative emotions and consumer behavioural intention to adopt emerging e-banking technology. *Journal of Financial Services Marketing*, *28*(4), 691–704. https://doi.org/10.1057/s41264-022-00172-x
- Abrahim Sleiman, K. A., Juanli, L., Lei, H. Z., Rong, W., Yubo, W., Li, S., Cheng, J., & Amin, F. (2023). Factors that impacted mobile-payment adoption in China during the COVID-19 pandemic. *Heliyon*, *9*(5), e16197. https://doi.org/10.1016/j.heliyon.2023.e16197
- Abubker, K., Sleiman, A., Juanli, L., Cai, X., Lei, H., & Liu, R. (2021). Antecedents of the Adoption of the New Mobile Payment System in Sudan. *Revista Argentina de Clínica Psicológica*, *30*(2), 212–227. https://doi.org/10.24205/03276716.2020.4020
- Ajouz, M., Abuamria, F., & Hammad, J. (2023). Factors Influencing Mobile Payment Adoption and Its Role in Promoting Financial Inclusion: An Integrated Reflective Model with Theory of Planned Behavior. *Lecture Notes in Networks and Systems*, *488*(February), 563–581. https://doi.org/10.1007/978-3-031-08090-6_36
- Aker, J. C., & Mbiti, I. M. (2010). Mobile phones and economic development in Africa. *Journal of Economic Perspectives*, *24*(3), 207–232. https://doi.org/10.1257/jep.24.3.207
- Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). Evaluating E-learning systems success: An empirical study. *Computers in Human Behavior*, *102*, 67–86. https://doi.org/https://doi.org/10.1016/j.chb.2019.08.004
- Al-Qudah, A. A., Al-Okaily, M., Alqudah, G., & Ghazlat, A. (2022). Mobile payment adoption in the time of the COVID-19 pandemic. *Electronic Commerce Research*, *24*(1), 427–451. https://doi.org/10.1007/s10660-022-09577-1
- Al-Sharafi, M. A., Al-Qaysi, N., Iahad, N. A., & Al-Emran, M. (2022). Evaluating the sustainable use of mobile payment contactless technologies within and beyond the COVID-19 pandemic using a hybrid SEM-ANN approach. *International Journal of Bank Marketing*, *40*(5), 1071–1095. https://doi.org/10.1108/IJBM-07-2021-0291
- Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, *37*(3), 99–110. https://doi.org/10.1016/j.ijinfomgt.2017.01.002
- Ali, A., Abd Rahman, M. S., & Bakar, A. (2015). Financial Satisfaction and the Influence of Financial Literacy in Malaysia. *Social Indicators Research*, *120*. https://doi.org/10.1007/s11205-014-0583-0
- Ali, A. Y. S., & Dhaha, I. S. Y. (2014). Factors influencing mobile money transfer adoption among Somali. *International Journal of Business, Economics, and Law*, *4*(1), 180–188.
- Alkhwaldi, A. F., Al-Qudah, A. A., Al-Hattami, H. M., Al-Okaily, M., Al-Adwan, A. S., & Abu-Salih, B. (2024). Uncertainty avoidance and acceptance of the digital payment systems: a partial least squares-structural equation modeling (PLS-SEM) approach. *Global Knowledge, Memory and Communication*, *73*(8–9), 1119–1139. https://doi.org/10.1108/GKMC-07-2022-0161
- Aquilla, B. (2025). *South Sudan's Liquidity Crisis Undermines Mobile Money Transactions*. https://classicfm924.com/south-sudans-liquidity-crisis-undermines-mobile-money-transactions/#:~:text=Mobile money was,mobile money agents.
- Asampana, I. (2022). *A DOPTION OF M OBILE C OMMERCE AND M OBILE P AYMENTS IN G HANA : A N E XAMINATION OF F ACTORS I NFLUENCING P UBLIC S ERVANTS*. *17*, 287–313.
- Azizi, S. M., Roozbahani, N., & Khatony, A. (2020). Factors affecting the acceptance of blended learning in medical education: application of UTAUT2 model. *BMC Medical Education*, *20*(1), 1–9. https://doi.org/10.1186/s12909-020-02302-2

- Badan, U. N. O. F. I., & Igeria, N. (2018). *P ERFORMANCE E XPECTANCY , E FFORT E XPECTANCY , AND F ACILITATING C ONDITIONS AS F ACTORS I NFLUENCING S MART P HONES U SE FOR M OBILE L EARNING BY P OSTGRADUATE S TUDENTS OF THE*. *14*.
- C.C, S., & Prathap, S. K. (2020). Continuance adoption of mobile-based payments in Covid-19 context: an integrated framework of health belief model and expectation confirmation model. *International Journal of Pervasive Computing and Communications*, *16*(4), 351–369. https://doi.org/10.1108/IJPCC-06-2020-0069
- Carlsson, C., Walden, P., & Bouwman, H. (2006). Adoption of 3G+ services in Finland. *IJMC*, *4*, 369–385. https://doi.org/10.1504/IJMC.2006.008947
- Chaveesuk, S., Khalid, B., & Chaiyasoonthorn, W. (2021). Digital payment system innovations: A marketing perspective on intention and actual use in the retail sector. *Innovative Marketing*, *17*(3), 109–123. https://doi.org/10.21511/im.17(3).2021.09
- Chawla, D., & Joshi, H. (2019). Consumer attitude and intention to adopt mobile wallet in India – An empirical study. *International Journal of Bank Marketing*, *37*(7), 1590–1618. https://doi.org/10.1108/IJBM-09-2018-0256
- Chen, L., & Nath, R. (2008). Determinants of Mobile Payments: An Empirical Analysis. *Journal of International Technology and Information Management*, *17*(1). https://doi.org/10.58729/1941-6679.1105
- Conway, P. (1994). *The economics of cash shortage*.
- Covering., H. S. is pictured looking at the camera straight on and smiling. S. wears a mauve head, & Salih, H. (2024). Digital money apps become a lifeline for war-affected Sudanese. *The New Humanitarian*. https://www.thenewhumanitarian.org/news-feature/2024/02/07/sudan-war-digital-money-online-banking-apps?utm_source=chatgpt.com
- Criterion, H. (2024). *Discriminant Validity Assessment : Use of Fornell & Larcker criterion versus Discriminant Validity Assessment : Use of Fornell & Larcker criterion versus HTMT Criterion*. *September 2017*, 1–7. https://doi.org/10.1088/1742-6596/890/1/012163
- Dafri, W., & Al-Qaruty, R. (2023). Challenges and opportunities to enhance digital financial transformation in crisis management. *Social Sciences and Humanities Open*, *8*(1), 100662. https://doi.org/10.1016/j.ssaho.2023.100662
- Daragmeh, A., Lentner, C., & Sági, J. (2021). FinTech payments in the era of COVID-19: Factors influencing behavioral intentions of "Generation X" in Hungary to use mobile payment. *Journal of Behavioral and Experimental Finance*, *32*, 100574. https://doi.org/10.1016/j.jbef.2021.100574
- Date, P. (2011). Mobile money. *Enterprise Development & Microfinance*, *22*(1). https://doi.org/10.3362/edm.2011.22.issue-1
- Donner, J., & Tellez, C. A. (2008). Mobile banking and economic development: Linking adoption, impact, and use. *Asian Journal of Communication*, *18*(4), 318–332.
- Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT): Towards a Revised Theoretical Model. *Information Systems Frontiers*, *21*(3), 719–734. https://doi.org/10.1007/s10796-017-9774-y
- Esawe, A. T. (2022). Understanding mobile e-wallet consumers' intentions and user behavior. *Spanish Journal of Marketing - ESIC*, *26*(3), 363–384. https://doi.org/10.1108/SJME-05-2022-0105
- Evans, J. R., & Mathur, A. (2018). The value of online surveys: a look back and a look ahead. *Internet Research*, *28*(4), 854–887. https://doi.org/10.1108/IntR-03-2018-0089
- Gerrard, P., & Barton Cunningham, J. (2003). The diffusion of Internet banking among Singapore consumers. *International Journal of Bank Marketing*, *21*(1), 16–28. https://doi.org/10.1108/02652320310457776
- Ghalandari, K. (2012). *The Effect of Performance Expectancy , Effort Expectancy , Social Influence and Facilitating Conditions on Acceptance of E-Banking Services in Iran : the Moderating Role of Age and Gender*. *12*(6), 801–807. https://doi.org/10.5829/idosi.mejsr.2012.12.6.2536
- Ghandour, A., Al-Srehan, H., & Almutairi, A. (2023). Analysis of Demand and Supply for Mobile Payments in the UAE during COVID-19. *Journal of Risk and Financial Management*, *16*(2). https://doi.org/10.3390/jrfm16020059
- Graziano, E. A., Musella, F., & Petroccione, G. (2024). Cashless payment: behavior changes and gender dynamics during the COVID-19 pandemic. *EuroMed Journal of Business*, *20*(5), 54–74. https://doi.org/10.1108/EMJB-11-2023-0299
- Hagger, M. S., Cheung, M. W.-L., Ajzen, I., & Hamilton, K. (2022). Perceived behavioral control moderating effects in the theory of planned behavior: A meta-analysis. In *Health Psychology* (Vol. 41, Issue 2, pp. 155–167). American Psychological Association. https://doi.org/10.1037/hea0001153
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R. L. (2010). *Multivariate Data Analysis.pdf*. https://www.drnishikantjha.com/papersCollection/Multivariate Data Analysis.pdf
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152. https://doi.org/10.2753/MTP1069-6679190202
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013). Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher

Acceptance. *Long Range Planning*, *46*(1–2), 1–12. https://doi.org/10.1016/j.lrp.2013.01.001

- Hansen, J. M., Saridakis, G., & Benson, V. (2018). Risk, trust, and the interaction of perceived ease of use and behavioral control in predicting consumers' use of social media for transactions. *Computers in Human Behavior*, *80*, 197–206. https://doi.org/10.1016/j.chb.2017.11.010
- Hou, M., Lin, Y., Shen, Y., & Zhou, H. (2022). Explaining Pre-service Teachers' Intentions to Use Technology-Enabled Learning: An Extended Model of the Theory of Planned Behavior. *Frontiers in Psychology*, *13*(July), 1–12. https://doi.org/10.3389/fpsyg.2022.900806
- Ismael Hashi, A. (2025). The Impact of Mobile Money Transfer in Somalia. *Journal of Technology and Systems*, *7*(3), 30–46. www.carijournals.orgwww.carijournals.orgwww.carijournals.org
- Jack, W., & Suri, T. (2011). Mobile Money: The Economics of M-Pesa. *NBER Working Paper Series*, 1–30.
- Jack, W., & Suri, T. (2014). Risk Sharing and Transactions Costs: Evidence from Kenya's Mobile Money Revolution. *American Economic Review*, *104*(1), 183–223. https://doi.org/10.1257/aer.104.1.183
- Jayarathne, P. G. S. A., Chathuranga, B. T. K., Dewasiri, N. J., & Rana, S. (2022). Motives of mobile payment adoption during COVID-19 pandemic in Sri Lanka: a holistic approach of both customers' and retailers' perspectives. *South Asian Journal of Marketing*, *November*. https://doi.org/10.1108/sajm-03-2022-0013
- Judson, R. (2024). Demand for U.S Banknotes at Home and Abroad: A Post-Covid Update. *International Finance Discussion Papers*, *2500*(1387), 1–42. https://doi.org/10.17016/ifdp.2024.1387
- Ketchen, D. J. (2013). A Primer on Partial Least Squares Structural Equation Modeling. *Long Range Planning*, *46*(1–2), 184–185. https://doi.org/10.1016/j.lrp.2013.01.002
- Kumari, P. (2025). *FACTORS AFFECTING FOR MOBILE BANKING USAGE IN COVID-19 PANDEMIC FACTORS AFFECTING FOR MOBILE BANKING USAGE IN COVID-19 PANDEMIC PERIOD IN SRI*. *March*.
- Lin, W. R., Lin, C. Y., & Ding, Y. H. (2020). Factors affecting the behavioral intention to adopt mobile payment: An empirical study in Taiwan. *Mathematics*, *8*(10), 1–19. https://doi.org/10.3390/math8101851
- Malarvizhi, C. A., Al Mamun, A., Jayashree, S., Naznen, F., & Abir, T. (2022). Predicting the Intention and Adoption of Near Field Communication Mobile Payment. *Frontiers in Psychology*, *13*(April), 1–12. https://doi.org/10.3389/fpsyg.2022.870793
- Malik, A., Mahmood, K., & Islam, T. (2023). Understanding the Facebook users' behavior towards COVID-19 information sharing by integrating the theory of planned behavior and gratifications. *Information Development*, *39*(4), 750–763.
- Mensah, I. K., & Khan, M. K. (2024). Unified theory of acceptance and use of technology (UTAUT) model: Factors influencing mobile banking services' adoption in China. *Sage Open*, *14*(1), 21582440241234230.
- Migliore, G., Wagner, R., Cechella, F. S., & Liébana-Cabanillas, F. (2022). Antecedents to the Adoption of Mobile Payment in China and Italy: an Integration of UTAUT2 and Innovation Resistance Theory. *Information Systems Frontiers*, *24*(6), 2099–2122. https://doi.org/10.1007/s10796-021-10237-2
- Modeling, S. E., Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). *A New Criterion for Assessing Discriminant Validity in Variance-based A new criterion for assessing discriminant validity in variance-based structural equation modeling*. *January*. https://doi.org/10.1007/s11747-014-0403-8
- Mohammed, A., Al-Swidi, A. K., Ferraris, A., & Jabeen, F. (2025). Mobile Payments in Health Crisis: A Comprehensive Approach to Analyzing Consumer Behavior in Emerging Markets. *International Journal of Consumer Studies*, *49*(3), 1–24. https://doi.org/10.1111/ijcs.70063
- Nanjero, W. O., & Sossouvi, K. (2021). Building resilience through digital financial services. *Digital Finance Market Impact Series*, *July*, 3–6. https://www.ifc.org/wps/wcm/connect/6378a1ae-eeb7-4a6a-86a8-92c2721081cc/Yemen-building-resilience-through-DFS.pdf?MOD=AJPERES&CVID=nOTKaZS
- Okaily, M. Al, Rahman, M. S. A., Ali, A., Shanab, E. A., Ra', N. A., Masa', ed, & deh, N. A. (2023). An empirical investigation on acceptance of mobile payment system services in Jordan: extending UTAUT2 model with security and privacy. *International Journal of Business Information Systems*, *42*(1), 123. https://doi.org/10.1504/ijbis.2023.128306
- Oyefolahan, I. O., Ahmed, S. A., & Abubakar, A. (2014). An empirical study of customers' adoption of mobile money transfer services in Somaliland. *2014 the 5th International Conference on Information and Communication Technology for the Muslim World, ICT4M 2014*, 5–9. https://doi.org/10.1109/ICT4M.2014.7020583
- Pagani, M. (2004). Pagani, M.: Determinants of adoption of third generation mobile multimedia services. Journal of Interactive Marketing 18, 46-59. *Journal of Interactive Marketing*, *18*, 46–59. https://doi.org/10.1002/dir.20011
- Ponsree, K., & Naruetharadhol, P. (2025). Unveiling the determinants of alternative payment adoption:

exploring the factors shaping generation Z's intentions in Thailand. *International Entrepreneurship and Management Journal*, *21*(1). https://doi.org/10.1007/s11365-024-01057-2

- Rahi, S., Mustafa, M., Mansour, O., Alghizzawi, M., & Alnaser, F. M. (2025). *Integration of UTAUT model in internet banking adoption context*. *13*(3), 411–435. https://doi.org/10.1108/JRIM-02-2018-0032
- Reuter, C., & Kaufhold, M. (2018). *25 Crisis Informatics*. *2007*, 737–770.
- Riffai, M. M. M. A., Grant, K., & Edgar, D. (2012). Big TAM in Oman: Exploring the promise of on-line banking, its adoption by customers and the challenges of banking in Oman. *International Journal of Information Management*, *32*(3), 239–250. https://doi.org/10.1016/j.ijinfomgt.2011.11.007
- Robert M Davis, Duane, and C. (1995). *Business Research for Decision Making*. Wadsworth Publishing Company. https://www.amazon.com/Business-Research-Decision-Making-Cosenza/dp/0534246125
- S. Davcik, N. (2014). The use and misuse of structural equation modeling in management research: A review and critique. *Journal of Advances in Management Research*, *11*(1), 47–81. https://doi.org/10.1108/JAMR-07-2013-0043
- San, B. M. (2024). *Money in the Digital Palm: The Role of Mobile Wallet Usage and Financial Literacy on Impulse Purchase Behavior of Youths in Myanmar*. *February*. https://www.researchgate.net/publication/378072799
- Sanne, P. N. C., & Wiese, M. (2018). The theory of planned behaviour and user engagement applied to Facebook advertising. *SA Journal of Information Management*, *20*(1), 1–11. https://doi.org/10.4102/sajim.v20i1.915
- Sayid, O., Echchabi, A., & Abd.Aziz, H. (2012). Investigating Mobile Money Acceptance in Somalia: An Empirical Study. *Pakistan Journal of Commerce & Social Sciences*, *6*(2), 269–281. http://www.jespk.net/publications/90.pdf
- Sekaran, U., & Bougie, R. (2009). Research Methods for Business: A Skill Building Approach (5th Edition). *International Journal of Information Technology and Management - IJITM*.
- Selvi, M. S., & Önem, Ş. (2025). Impact of Variables in the UTAUT 2 Model on the Intention to Use a Fully Electric Car. *Sustainability (Switzerland)*, *17*(7), 1–24. https://doi.org/10.3390/su17073214
- Shaikh, A. A., & Karjaluoto, H. (2015). Mobile banking adoption: A literature review. *Telematics and Informatics*, *32*(1), 129–142. https://doi.org/10.1016/j.tele.2014.05.003
- Tamilmani, K., Rana, N. P., & Dwivedi, Y. K. (2021). Consumer Acceptance and Use of Information Technology: A Meta-Analytic Evaluation of UTAUT2. *Information Systems Frontiers*, *23*(4), 987–1005. https://doi.org/10.1007/s10796-020-10007-6
- Tan, M. L., Prasanna, R., Stock, K., Hudson-Doyle, E., Leonard, G., & Johnston, D. (2019). Enhancing the usability of a disaster app: Exploring the perspectives of the public as users. *Proceedings of the International ISCRAM Conference*, *2019-May*(May), 876–886.
- Tenenbaum, G., & Eklund, R. C. (2020). Handbook of sport psychology: Fourth edition. *Handbook of Sport Psychology: Fourth Edition*, *1–2*, 1–1333. https://doi.org/10.1002/9781119568124
- Teo, A. C., Tan, G. W. H., Ooi, K. B., Hew, T. S., & Yew, K. T. (2015). The effects of convenience and speed in m-payment. *Industrial Management and Data Systems*, *115*(2), 311–331. https://doi.org/10.1108/IMDS-08-2014-0231
- Upadhyay, N., Upadhyay, S., Abed, S. S., & Dwivedi, Y. K. (2022). Consumer adoption of mobile payment services during COVID-19: extending meta-UTAUT with perceived severity and self-efficacy. *International Journal of Bank Marketing*, *40*(5), 960–991. https://doi.org/10.1108/IJBM-06-2021-0262
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information: Towar a Unified View. *MIS Quarterly*, *27*(3), 425–478. https://www.jstor.org/stable/30036540
- Venkatesh, V., Thong, J. y. ., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology by Viswanath Venkatesh, James Y.L. Thong, Xin Xu :: SSRN. *MIS Quarterly*, *36*(1), 157–178. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2002388
- WAGNER, A. (2025). *How Sudan Relies on Online Banking and Digital Payments Amid Currency Crisis and War*. https://www.okayafrica.com/how-sudan-relies-on-online-banking-and-digital-payments-amid-currency-crisis-and-war/249813
- Yan, C., Siddik, A. B., Akter, N., & Dong, Q. (2023). Factors influencing the adoption intention of using mobile financial service during the COVID-19 pandemic: the role of FinTech. *Environmental Science and Pollution Research*, *30*(22), 61271–61289. https://doi.org/10.1007/s11356-021-17437-y
- Yang, K., & Jolly, L. (2009). The effects of consumer perceived value and subjective norm on mobile data service adoption between American and Korean consumers. *Journal of Retailing and Consumer Services*, *16*, 502–508. https://doi.org/10.1016/j.jretconser.2009.08.005
- Zhao, Y. (2021). *How Does the Pandemic Facilitate Mobile Payment ? An Investigation on Users ' Perspective under the COVID-19 Pandemic*.