DETERMINANTS OF CUSTOMER SATISFACTION TOWARD MOBILE BANKING: A CASE STUDY OF BANK KHARTOUM IN SUDAN

A Thesis

Submitted to the Master's Study Program of Economics at the Faculty of Economics and Business in partial fulfillment of the requirements for the degree of

Master of Arts in Economics (M.A.)

by:

Husny Gibreel Musa Saleh

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UNIVERSITAS ISLAM INTERNASIONAL INDONESIA

DEPOK

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ABSTRACT

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This research investigates the determinants of customer satisfaction toward mobile banking services at the Bank of Khartoum in Sudan. To achieve this, a structured questionnaire was used with 300 respondents, while 266 were usable for analysis, with an 88.7% response rate. The research employed SEM-PLS to estimate the data. The findings revealed that E-Service Quality, E-Trust, and Customer Value significantly influence Customer Satisfaction, with E-Trust also positively affecting Customer Value. However, E-Service Quality was not found to have a significant effect on Customer Value. Moreover, E-Trust acted both as a direct and indirect driver of satisfaction, highlighting its central role in digital financial service evaluation. These results offer empirical support for the Theory of Planned Behavior (TPB), Expectation-Confirmation Theory (ECT), and SERVQUAL model in a conflict-affected, developing economy context. The findings contribute to the literature by providing a new understanding of customer experience and digital trust in post-crisis banking environments. Additionally, the study offers practical implications for enhancing digital banking performance and customer engagement at the Bank of Khartoum. This research also provides policy recommendations that can help strengthen digital trust, promote customer value, and support financial inclusion in Sudan. However, this study has some limitations. It focused only on active mobile banking users of Bank of Khartoum; future research should compare multiple banks and include non-users to better understand satisfaction dynamics across the Sudanese digital financial sector.

Keywords: Customer Satisfaction, Customer Value, E-Service Quality, E-Trust, SmartPls

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CHAPTER I

INTRODUCTION

1.1 Background

In today's world, the digital economy has arisen as a key feature, determining how services are rendered, how people connect, and even how work is performed. The concept of the digital economy rests on technology, which eliminates the friction between people, businesses, and institutions Das, (2024). It beats the limitations of distance, permitting people to communicate, transact, and exchange information with others anywhere at any time. Through applications like mobile banking and online platforms for shopping and paying through various online systems, the digital economy has enhanced convenience, efficiency, and interconnectedness in life (Rafique & Qadir, 2024). They have enabled companies to grow beyond local destinations so that even small businesses can operate in global economies. At the same time, it has also given people in isolated places opportunities that they had never thought would be available, increasing economic involvement and better financial inclusion (Mahmud et al., 2023).

However, the Rapid growth in the digital economy has drawbacks. Although its advancements have enabled millions, problems remain, such as a lack of technology and threats to cybersecurity or privacy. The digital gap isolates some of the population and does not allow them to exploit the tools and services that drive the new economy Tinggi et al., (2024). Also, the more one becomes bound to a system, the more one becomes susceptible to its technical faults, cyber-attacks, or any major emergency. These problems illustrate the importance of using social investment in infrastructure, security measures, and development policies to prevent the digital economy from harming various classes of society. In this case, the banking industry, one of the most important subjects, emerged as a part of the digital economy that works as its core. The role of banks goes well beyond keeping your money safe and lending it out, as in the past. These days, the banking industry is one of the best innovators in technology, especially in meeting the need to integrate online tools to enhance the quality and efficiency of services. Customers have entirely altered their methods of engaging with their financial institutions due

to mobile banking applications, internet payment systems, and digital wallets Asmar & Tuqan, (2024). With only a few clicks, processes that previously necessitated physical interaction can now be accomplished, offering customers unparalleled authority over their finances. Nevertheless, this revolution has not been easy. The digitalization of the banking system increases customer expectations for efficiency, safety, and effectiveness. These advancements have certainly increased customer comfort, but have also put the banks at risk for cybercrimes, system failures, and data leaks, lowering the customers' trust (Jameaba, 2020).

Africa's digital economy has shifted into a crucial aspect for social and economic alteration with the utilization of mobile technology, which enables contact between individuals and businesses without any barriers, including geography or infrastructure, and is widely used. M-Pesa and Flutter Wave have helped achieve greater financial inclusion and benefit SMEs. At the same time, Jumia and Konga helped integrate other African countries into the global market while expanding sales Abubker et al., (2021). The growth within telecommunications, digital infrastructure, education, and health successfully makes various services available to a wide range of people and develops human resources. Nevertheless, infrastructure shortcomings, fragmented regulations, cybersecurity risks, and other issues have slowed the economic growth rate using a digital economy. New initiatives must also prioritize the promotion of digital literacy, investment in emerging technologies such as AI and IoT, improving digital infrastructure, and harmonizing regulations to maximize the potential for new strategies that can be implemented. These difficulties must be addressed by ensuring political stability and economic diversification and utilizing knowledge of technology and demographic trends. Africa's digital economy has the potential to foster improvements in inclusive growth and social development within the country (Alamer et al., 2024).

The advancement of mobile devices and the internet in Sudan is drastically changing how services, businesses, and interpersonal interactions are conducted Mohamed et al. (2024). Further development of mobile services is directed towards increasing financially underserved communities' access to secure mobile money services (Mohamed et al., 2024b). Simultaneously, the e-commerce market is

growing with initiatives such as Sudan Shop, which is gradually lifting barriers that prevent foreign markets from reaching Sudanese businesses Allagabo et al. (2024). Sudatel and Zain Sudan are at the forefront of this effort to supply requisite tools ranging from a 4G infrastructure to fibre optics for fast, reliable internet (Edet, 2024). On the contrary, the struggle that arose out of the April 2023 conflict has negatively affected several industries, including the banking sector, which, as a result, placed suspensions on the 'Bankak' mobile app alongside the Bank of Khartoum's operations Omer et al., (2021). This impacted customers' perception of the banking system as they developed concerns about the stopped provision of digital services, significantly impacting their trust in their digital experience. Despite this, the adolescent, dynamic, and alert tech ecosystem, alongside the diversity in Sudan, has dramatically increased the nation's potential for growth. As an avenue for future research, examining the impact of the conflict on trust and satisfaction with digital banking and devising ways to bolster the resilience and reliability of e-services in conflict aftermath environments is pertinent. Edet, (2024). Moreover, investments in fast-evolving technologies such as AI, IoT, and Blockchain, together with the promotion of public-private collaboration, are vital strategies in addressing the current challenges and speeding up the digital transformation in Sudan, hence restoring and building customer trust in the digital economy (Makki Hanafi & Alfadil Yahia, 2022).

In addition, the expansion of fintech companies has increased competition, which makes it vital for banks to act efficiently while retaining customer loyalty. In disaster-torn areas, the significance of a digital banking system is greatly enhanced as it remains the most convenient alternative for carrying out financial transactions. On the other hand, these crises depict the inadequacies of digital systems while emphasizing the critical need for substantial infrastructure and adequate customer support. With the acceleration of the digital economy, the banking industry is in a position with great potential but also profound responsibility and duty Murinde et al., (2022). This means it is about consulting the warning signs and issues without losing service reliability, security, and inclusiveness (Reddy et al., 2024). Such an environment can foster relevance and engender the capability of contributing to the digital economy. These inherent relationships of chances and challenges make the

study of the evolution of the banking system in the context of the rapid development of information technology most relevant. The issues of the development of the banking system in the context of the development of modern financial technology have become especially relevant now, looking at the relevance of the services provided (Asmar & Tuqan, 2024).

According to Figure 1.1 below presents the growth trend of internet users in Sudan. As we can see, internet users increased from 12.9 million in 2021 to 13.99 million in 2024, which is 8.45%. In 2024, internet usage was 28.7%, driven by 29.15 million mobile Internet connections. This growth indicates a larger digital environment in which e-banking and digital financial services can be developed, which benefits institutions like the Bank of Khartoum. According to Mohamed et al. (2024), the Internet revolutionizes international trade and e-business, and Sudan is shifting in those directions, although considerable obstacles in communication and IT education still exist. The Bank of Khartoum has an excellent opportunity to further increase e-service quality, concentrating on reliability, usability, security, and responsivity, and to gain e-trust to meet the increasing and more demanding customer needs, especially in the field of secured online financial services Kuznetsova & Tolbert, (2024). As a crisis recovery gets under process, e-trust becomes paramount for maintaining customer confidence. In the following case of the digital services offered by the Bank of Khartoum, delivering consistent quality results can increase the customers' value and satisfaction, thereby improving their loyalty in the somewhat competitive digital environment. (Mohamed et al., 2024).

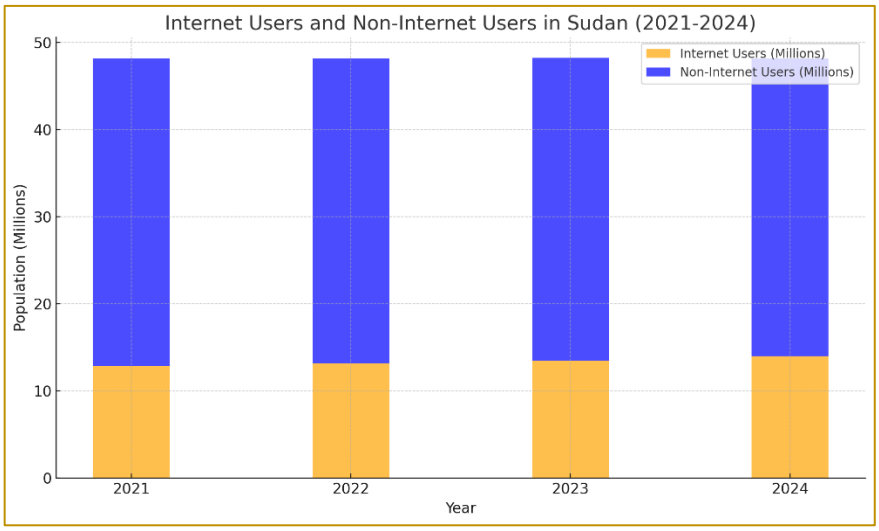

Figure 1. 1 Internet Users in Sudan

Source: Global Findex Database 2024

The Digital Payment Transactions in Sudan. It also presents a graphical analysis of the growth in the number and nominal value of digital payment transactions in Sudan for Islamic and conventional banks. All the above trends underline the fact that the quality of e-service and e-trust improves customer perceived value and customer satisfaction, especially in crisis recovery situations, according to Putri & Ginting, (2021). Bank of Khartoum has revealed steady growth in the transactions, meaning that there is enhanced adoption of digital banking, where security and efficiency of services endear the customer and hence enhance loyalty. From the case, since it is an Islamic financial institution, the bank is well-positioned to use online solutions to enhance its position in the market and offer customers a helping hand in economic crises (Abubker et al., 2021).

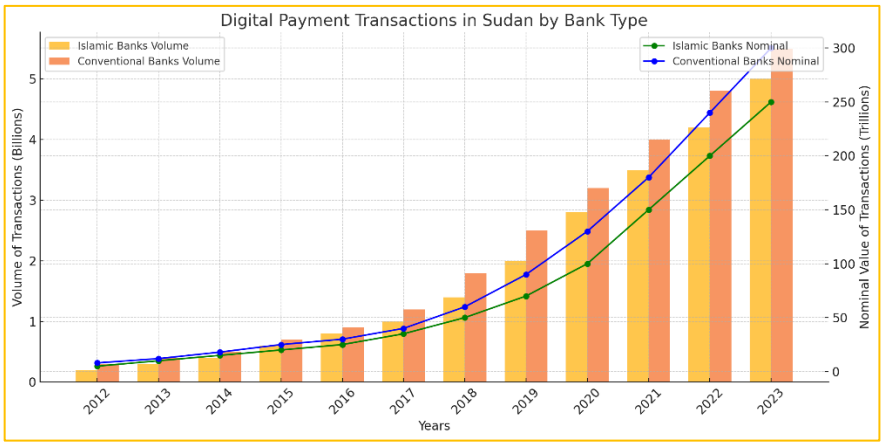

Figure 1. 2 Digital Payment Transactions in Sudan

Source: World Development Indicators - Sudan

According to Figure 1.3, below shows a shift in the age distribution of Bank of Khartoum users between 2000 and 2025. Younger age groups (18–25 and 26–35) demonstrate increasing engagement, driven by the adoption of digital banking services, while older age groups (36–45, 46–55, and 56+) show a steady decline. This trend reflects the success of digital platforms like the Bankak application in attracting tech-savvy younger users, while older users may face barriers like unfamiliarity with digital tools (Darmawan, 2024).

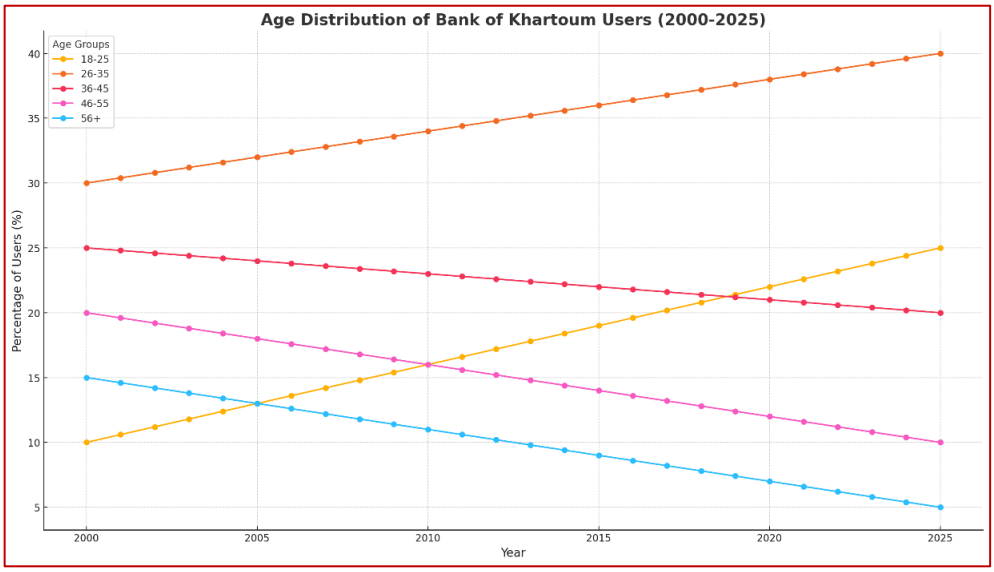

Figure 1. 3 Bank of Khartoum users between 2000 and 2025

Source: World Development Indicators – Sudan

Regarding Figure 1.4 below shows the annual migration of the new bank accounts opened in the Bank of Khartoum between the years 2000 and the year 2025. It shows a consistent growth in the number of new accounts, which can be attributed to more and more customers adopting the services of banks as years pass by. Stable growth in the new accounts supports the fact that the customers are becoming more and more dependent on the banking services and online platforms (Chong et al., 2025).

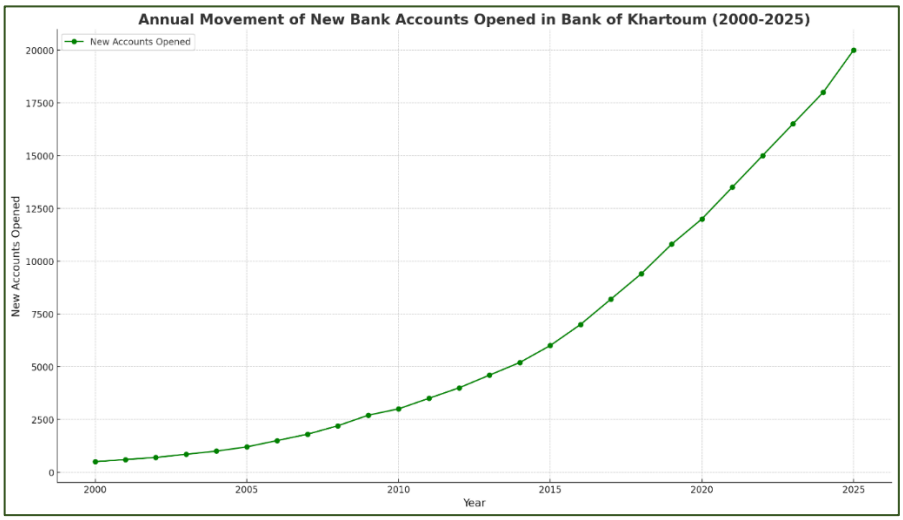

Figure 1. 4 annual movement of new bank accounts, Bank Khartoum Users

Source: Financial Sector Development Strategy

As Figure 1.5 below, which represents the development of the banking sector in Sudan over the period 2000 to 2025, trends in the number of commercial banks, Islamic banks, and microfinance institutions are illustrated. It points only to the historic growth of the sector, which means a deeper integration of finance with people and a greater diversification of the banking market. The fact that there are rising numbers of commercial banks alludes to the developing formality in terms of financial structure that attempts to cater to a variety of customer requirements, whereas the presence of Islamic banks attests to the necessity of Sharia-compliant financial services, which is a major inclination among the Muslims in Sudan. In the meantime, the fact of burgeoning microfinance institutions represents the attempts to contact the marginalized groups, to encourage the economic activity of the low-income factions. The growth in the banking system is also an indication of a transforming financial system, whereby banks are imperative in promoting the

growth and development of the economy. It also means that there will be more competition among the institutions, which can be taken as a catalyst of innovation and better delivery of services, specifically in the sphere of digital banking. With the banks becoming more diverse and expanding on their services, it is even more important that they embrace some of the soundest e-service platforms that will meet the different customer demands, as well as, expectations. The observed trends in this chart form a background where I shall study the role of e-service quality and customer trust in this volatile yet fast-growing industry (Hapsari et al., 2025).

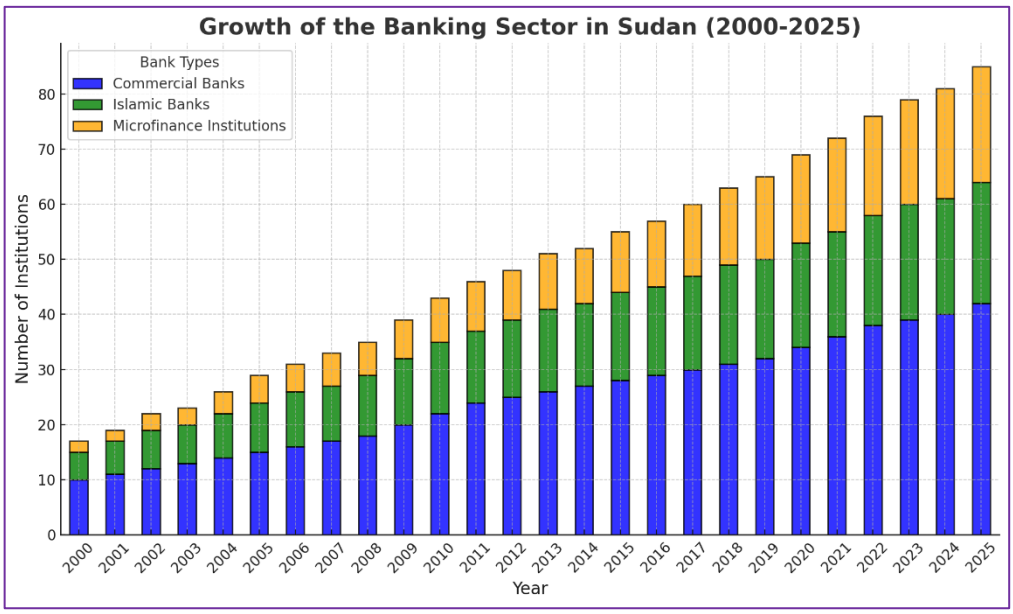

Figure 1. 5 growth of the banking sector in Sudan from 2000 to 2025

Source: datatopics.worldbank.org

As indicated in this analysis shown in Figure 1.6 below, the location of digital banking in the development of financial access in Sudan cannot be overemphasized. Nevertheless, it exposes weaknesses that imperil development, especially when there is are crisis. These challenges are met by e-service quality and e-trust, which offer a framework to enhance the digital banking system so as to enable financial inclusion even in conflict-prone situations. This connection shows how applicable and feasible this thesis is to the overall financial environment in Sudan (Haza Fatikah & Albanna, 2022).

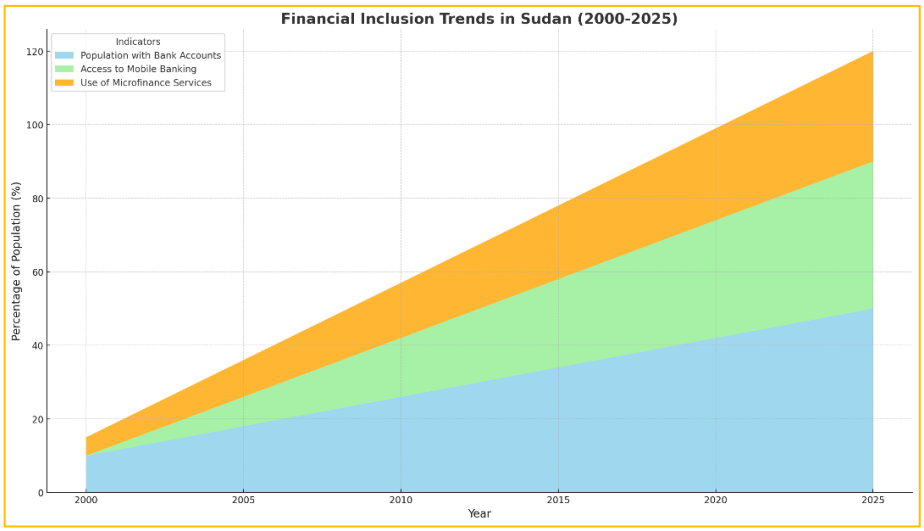

Figure 1. 6 financial inclusion trends In Sudan

Source: datatopics.worldbank.org

1.2 Problem Statement

The outbreak of conflict in Sudan in April 2023 profoundly impacted multiple sectors, notably the banking industry. As the crisis intensified, the Bank of Khartoum encountered significant operational challenges, temporarily suspending its services. This disruption primarily affected the Bankak digital services, especially the Bankak mobile application, leading to widespread customer concerns regarding the reliability and trustworthiness of the bank's digital offerings. Although the issue was eventually resolved, the incident revealed critical vulnerabilities in customer trust and satisfaction related to e-services (Yolanda & Handayan, 2024).

Digital banking platforms are essential lifelines during crises, providing continuous access to financial services when physical branches are inaccessible or unsafe. Consequently, customer expectations for these platforms' reliability, security, and responsiveness are heightened. The suspension of the Bankak application exposed significant gaps in the bank's preparedness to maintain service delivery under adverse conditions, resulting in increased customer dissatisfaction and diminished trust in the bank's ability to manage its e-services effectively Asmar & Tuqan, (2024). Research by Alnaim & Sobaih, (2022) corroborates that failures in digital service quality can substantially undermine customer confidence and overall satisfaction. Additionally, global studies emphasize the necessity of robust

digital infrastructures to sustain customer satisfaction during crises ((Alnaim & Sobaih, 2022)

The impact of the Sudan conflict on the Bank of Khartoum highlights a broader research gap in understanding the dynamics of e-service quality and e-trust during crisis recovery. While existing literature underscores the importance of these factors in enhancing customer satisfaction in stable environments, there is a lack of empirical evidence regarding their influence in crisis-affected settings. This gap is particularly relevant for regions characterized by political instability and fragile economic systems, where digital banking services often serve as the primary means of financial access Das, (2024). The disruption of Bankak services demonstrates the need for banks to develop robust digital infrastructures capable of sustaining operations during crises. Insights from this research can guide the Bank of Khartoum and other financial institutions in creating strategies to enhance service resilience, minimize disruptions, and maintain customer trust and satisfaction during similar crises in the future (Vera, 2022).

The purpose of this section was to provide a clear understanding of the innovations and research gap of the study so that research questions and objectives can be developed and understood by the reader. Because of this, the formulation of a research question, Research Hypothesis, and objectives is possible. At this point, the argument's underlying framework can be disassembled and studied in greater depth.

1.3 Research Questions

These questions were designed to dissect the direct effects of each e-service quality and e-trust dimension on e-satisfaction, the mediating role of customer value in transforming e-service quality into e-trust, and the direct relationship between e-service quality dimensions and e-trust. Here are the proposed research questions:

1. Does E-Service Quality Influence Customers' Satisfaction at Bank of Khartoum?

2. Does E-service Quality Influence Customers' Satisfaction Mediated by Customer Value at Bank of Khartoum?
3. Does E-Trust Influence Customers' Satisfaction Mediated by Customer Value at the Bank of Khartoum?
4. Does e-Trust Influence Customers' Satisfaction at Bank of Khartoum?
5. Does Customer Value Influence Customer Satisfaction at Bank of Khartoum?

1.4 Research Objectives

The research objectives for a study on the impact of e-service quality and e-trust on customers' Satisfaction with the Bank of Khartoum in Sudan, with the mediation of customer value, particularly within the context of Bank Khartoum services, were aim to both explore and quantify the relationships depicted in the conceptual framework you've provided. Here are the research objectives that align with that framework:

1. To examine the influence of e-service quality on customer satisfaction at the Bank of Khartoum.
2. To examine the influence of e-service quality on customers' satisfaction mediated by customer value at the Bank of Khartoum.
3. To examine the influence of e-trust on customers' satisfaction at the Bank of Khartoum.
4. To examine the influence of e-trust on customers' satisfaction mediated by customer value at the Bank of Khartoum.
5. To examine the influence of customer value on customer satisfaction at the Bank of Khartoum.

1.5 Research Hypothesis

1. H1: E-service Quality positively influences Customer Satisfaction at the Bank of Khartoum.
2. H2: E-service Quality positively influences Customer Satisfaction, mediated by Customer Value at Bank of Khartoum.
3. H4: E-Trust positively influences Customer Satisfaction at Bank of Khartoum.

4. H3: E-Trust positively influences Customer Satisfaction mediated by Customer Value at Bank of Khartoum.
5. H5: Customers' Value positively influences Customer Satisfaction at the Bank of Khartoum.

1.6 The Significance of the Research

The significance of this research lies in its contextual relevance to post-crisis service recovery and digital trust within Sudan's banking sector, particularly at a time when political instability and armed conflict have profoundly disrupted financial infrastructures. While global studies often address e-service quality, customer value, and digital trust under stable conditions, there is a notable gap in understanding how these constructs interact in fragile and crisis-affected environments. This study provides critical insights into how customers of the Bank of Khartoum experience, evaluate, and respond to digital banking services during a national emergency, where digital platforms often serve as the only accessible financial channels.

By examining the mediating role of customer value between e-service quality, e-trust, and satisfaction, this study contributes to both theoretical and practical understandings of how trust is rebuilt and satisfaction restored during crisis recovery. The findings enrich the literature by grounding service evaluation not just in technical performance but in the emotional and contextual factors that shape consumer behavior during periods of uncertainty. Moreover, the study applies a multi-theoretical framework (TPB, SERVQUAL, and ECT) to demonstrate how customer perceptions shift in response to institutional disruptions, highlighting the adaptive strategies required by financial institutions to sustain operations and rebuild relationships in post-conflict settings. Practically, the research offers valuable guidance for banks, policymakers, and regulators in Sudan and other conflict-affected regions on how to design and manage resilient digital service systems. Insights derived from this study can support the development of crisis-response strategies, digital trust-building mechanisms, and policies that promote customer satisfaction and retention amid instability. In doing so, this research not only contributes to academic discourse but also to the practical agenda of financial resilience, inclusion, and trust restoration in fragile states.

1.7 Research Benefit

The findings of this research offer significant value to academics, practitioners, financial institutions, and policymakers by shedding light on customer behavior and digital banking performance in crisis-affected environments, particularly within the context of Sudan's post-conflict recovery. The following are the key expected benefits of the study:

1. This study contributes to the academic literature by examining how e-service quality and e-trust influence customer satisfaction through the mediating role of customer value, using a multi-theoretical approach (SERVQUAL, TPB, and ECT). It fills a critical gap by contextualizing these relationships within a conflict-impacted financial ecosystem, where digital service reliability, emotional reassurance, and trust become paramount. This contribution is particularly important in understanding consumer behavior in fragile states, where conventional models may not fully capture post-crisis decision-making dynamics.
2. This study provides an important lesson to the Bank of Khartoum and other related financial institutions in the way they can craft more formidable digital banking solutions that can withstand the shock of conflict. This study helps banks rely on dimensions of service and trust components that a customer appreciates most during and after the crisis in the selection of features important in building trust and reliability in the digital platform. These results are crucial in enhancing customer retention and satisfaction under uncertain environments.
3. The study offers policy recommendations that the government and regulators in Sudan can follow to cushion the financial sector against and after the occurrence of shocks in the system. These comprise policies to boost digital financial infrastructure, service continuity strategy, and formulation of regulatory frameworks that promote consumer protection and digital confidence. The findings also point out the requisite crisis communication messages and backup plans to ensure consumer confidence during the breakdown of an institution.

4. Digital banking is a valuable instrument of financial inclusion in the scenario of a crisis, where the traditional channels of accessing banks might remain out of reach. This study points to the importance of customer value and restoring customer trust as a tool to allow vulnerable groups of people to restore their access to services they need and cannot live without, in terms of providing financial opportunities. In this way, the research can serve higher purposes of economic stability, digitalization, and social resilience of fragile and developing economies.
5. The paper establishes the foundation for future studies on service quality and satisfaction in post-conflict and disaster recovery environments. It urges researchers to think about context-specific theories and get to know how emotional, institutional, and technological elements intertwine to define consumer experiences in emergencies. This work is essential to further spread the knowledge about how disruption can change the design and delivery of services introduced and managed in an ethical and efficient way.

1.8 Research Limitation

Although this study has provided valuable conclusions regarding customer satisfaction and digital trust in the bank context of a post-crisis situation, it has various limitations. First, the study is contextual, proving ultra philosophical since it only targets the digital banking environment in Sudan that is undergoing recovery after the 2023 war. This adds more relevance to regions affected by crises, but it constrains the generalizability of the study results on more stable economies or those undergoing technological progress. Second, the research will only capture active users of the Bank of Khartoum online services, but will not cover non-users and those who might have lost interest in using the digital services because of a lack of satisfaction or difficulty accessing services. Such a purposive sampling, although appropriate in assessing the views of experienced users, does not include views that are important in comprehending digital exclusion. Third, information has been collected only in the largest urban centers where bank offices and digital infrastructure functionality are considered, which may not apply to the rural or significantly disrupted regions where service availability is less accessible. Last, the cross-sectional study design reflects the perceptions of a given time and fails to

take into consideration the possibilities of changing perceptions over time, as the crisis recovery is made. Future studies would benefit by using a longitudinal design, including rural contexts, and institutional comparisons in diverse places, to allow a more complete description of digital banking resilience in fragile environments.

1.9 Research Novelty

The following table summarizes the five most significant novelties of the thesis titled 'Determinants of Customer Satisfaction Toward Mobile Banking: A Case Study of Bank Khartoum in Sudan'. These points highlight the study's unique contributions to theory, context, methodology, and policy implications.

Table 1. 1 Research Novelty

No.	Novelty Description
I.	Contextualization of Customer Satisfaction in a Post-Conflict Environment: The study uniquely examines mobile banking satisfaction in Sudan's post-crisis recovery, offering rare empirical insight into digital behaviour in fragile states.
II.	Integration of TPB, SERVQUAL, and ECT into a Unified Model: Combining three major theories into one framework provides a holistic analysis of satisfaction, trust, and value, rarely seen in similar studies.
III.	Mediating Role of Customer Value in Crisis Contexts: Customer Value is tested as a mediator between E-Service Quality, E-Trust, and Customer Satisfaction, emphasizing its role in trust recovery during digital disruptions.
IV.	Empirical Use of SEM-PLS with Conflict-Affected Sampling: Applies SmartPLS on primary data collected from active users during and after Sudan's 2023 conflict, highlighting a robust methodology rarely used in fragile economies.
V.	Policy and Design Recommendations for Digital Trust Recovery: Proposes practical solutions for banks and regulators to rebuild digital trust, improve responsiveness, and enhance system resilience in post-conflict financial services.

1.10 Outline of the Research

This thesis was structured in the following manner to effectively complete the predetermined goals and come up with solutions to the research problem: The literature was be presented in chapter two, the methodology and data used in this research was explained in chapter three, the findings was presented and discussed in chapter four, and finally, the conclusions and recommendations was be presented in chapter five.

CHAPTER II

LITERATURE REVIEW

Establishing a theoretical framework is a necessary step in gaining an understanding of customer Satisfaction regarding Bank of Khartoum during Crisis Recovery. Evaluating previous research and formulating hypotheses are the next steps that must be taken. As a result, in the first section of this chapter, we outline the theoretical foundations upon which this research is based. Later on, in the second section, we reviewed and discussed the literature on the awareness regarding the Bank of Khartoum during Crisis Recovery by providing pertinent studies. In the third section, we discussed published research related to the criteria that clients consider when deciding whether or not they are Satisfied or continue using the Bank of Khartoum service. In the meantime, the development of the research hypothesis is going to take place. In the last section, an overview of the Bankak system was presented Alfeel et al., (2025). This study adopts a multi-theoretical approach by integrating the Theory of Planned Behavior (TPB), Expectation Confirmation Theory (ECT), and the SERVQUAL model to comprehensively explain the determinants of customer satisfaction toward mobile banking in Sudan. Each theory was selected based on its relevance to the study's objectives, the nature of mobile banking services, and the crisis-recovery context of the research setting (Saima et al., 2024).

2.1 Theoretical Framework

2.1.1 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) is an extension of the Theory of Reasoned Action (TRA), which asserts that an individual’s intention to engage in a behavior is the most immediate predictor of that behavior Arthur et al., (2024). While TRA accounts for attitudes and subjective norms as key determinants of behavioral intention, TPB strengthens the framework by introducing perceived behavioral control, which represents a person’s perception of their ability to perform the behavior. This addition makes TPB particularly effective in predicting behavioral outcomes in complex environments, such as the adoption of digital banking services

in post-conflict economies like Sudan (Maryam et al., 2022). In the context of this study, TPB is utilized to explain how Sudanese mobile banking users form intentions to trust digital platforms, specifically, the Bankak mobile application offered by the Bank of Khartoum. Within the TPB framework, attitude reflects a user's positive or negative evaluation of mobile banking its safety, usefulness, or convenience, subjective norms refer to the perceived social influence from peers, family, or community to use or trust the app, and perceived behavioral control captures the user's sense of self-efficacy and access to necessary resources such as internet connectivity or digital literacy. Together, these constructs shape the intention to trust, which then influences actual E-Trust behavior (Tiwari et al., 2024). previous research confirms TPB's utility across various domains, including health, finance, and technology, where behavioral decisions are influenced by both personal and external factors Ajzen, (2024); Arthur et al., (2024). In digital banking, especially during crisis conditions, these factors become even more critical as users assess risk, reliability, and control in uncertain circumstances. Furthermore, TPB is underpinned by three belief categories that shape intention: (1) behavioral beliefs, which influence attitudes; (2) normative beliefs, which drive subjective norms; and (3) control beliefs, which form the basis of perceived behavioral control. These beliefs interact to form the user's intention to trust, making TPB a suitable and robust framework for investigating E-Trust in Sudan's post-conflict digital economy (Usman et al., 2024).

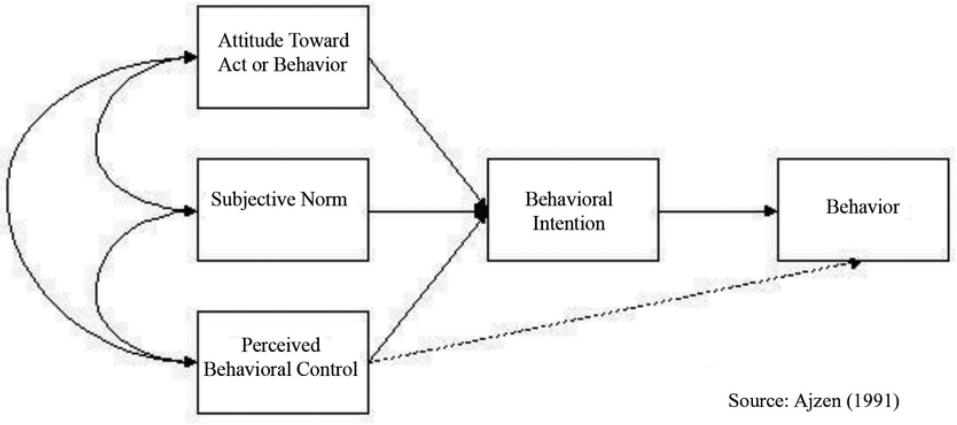

Figure 2. 1 Structural Model of TPB

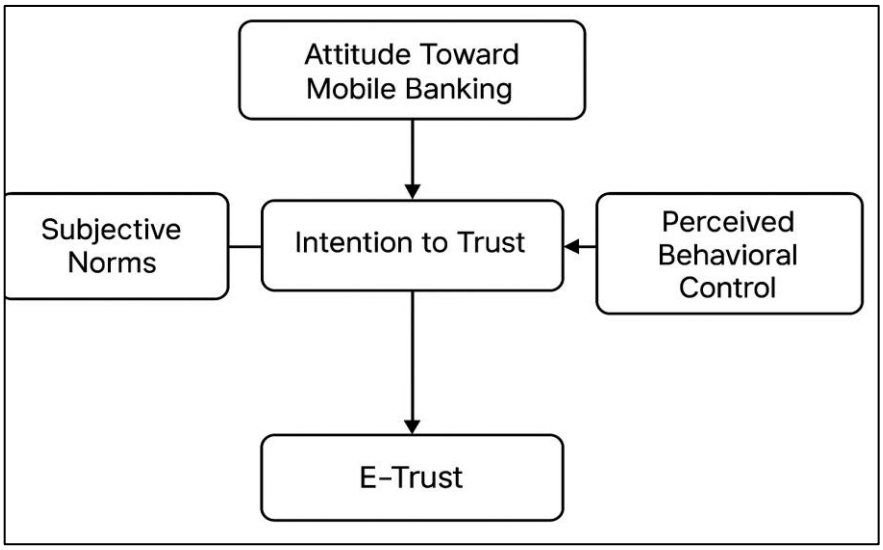

Figure 2. 2 TPB Model of E-Trust in Mobile Banking

Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2021)

The Theory of Planned Behavior (TPB) has been widely adopted to explain individuals' intentions and behavior across diverse fields, including healthcare, environmental decisions, and technology adoption. In the context of this study, TPB was applied to examine the intention to trust digital banking services, particularly the Bankak mobile application offered by the Bank of Khartoum. Drawing from its three core components, attitude, subjective norm, and perceived behavioral control, TPB helps clarify how users' trust in digital platforms emerges, especially in conflict-affected environments where traditional institutional trust is weakened. Consistent with Ajzen (2025), this study found that each component had a significant influence on users' intention to trust, which in turn predicted E-Trust, reinforcing the theoretical validity of TPB in digital financial services.

Although TPB offers a systematic lens to assess how users develop trust in mobile banking, certain limitations emerge when it is applied to post-conflict environments like Sudan. One of the main critiques of TPB is that it does not explicitly account for emotional and contextual factors such as institutional breakdown, trauma, or infrastructural fragility, all of which are highly relevant in war-impacted economies. In such settings, users' trust decisions may be shaped as much by past crisis experiences or survival needs as by rational evaluations of behavioral control or peer norms. This suggests that TPB, while useful, may

oversimplify the complexity of trust formation in volatile regions. A Recent Study by Naskar et al. (2025) also argues that TPB tends to be more predictive than explanatory, meaning it may be effective at estimating intention but less capable of uncovering why such intentions form. This is especially important in digital trust contexts, where motivations may be driven by safety, urgency, or social pressure rather than personal attitudes alone. Moreover, TPB rarely incorporates trust-specific antecedents such as perceived system integrity, platform transparency, or government regulation, all of which are crucial in rebuilding public trust after systemic disruption. Therefore, although TPB remains a valuable baseline model for understanding trust formation in mobile banking, its explanatory power could be improved by integrating it with other frameworks such as Institutional Trust Theory, Technology Readiness Index, or Crisis Resilience Models. These hybrid approaches may offer more contextual sensitivity and better reflect how users in Sudan navigate uncertainty, risk, and technological reliance amid recovery efforts (Elkreem & Jaspars, 2024).

2.1.2 Expectation Confirmation Theory ECT

The Expectation Confirmation Theory, developed by Oliver in 1980, is one of the most prominent theories in analyzing consumer behavior and won't seem strange to consumer scholars. Expectation disconfirmation theory explains the process of satisfaction evaluation in terms of the disconfirmation of expectation or its validation after the consumption of a good or service Saima et al., (2024). ECT proposes that two key aspects of a person's satisfaction level are one's evaluation of their experience with the product: their original expectations about it, and how well the product performed. There is positive disconfirmation and thus satisfaction whenever actual performance meets or exceeds expectations. Negative disconfirmation and, therefore, dissatisfaction exist when actual performance is below what was expected in the first place. It further states that post-consumption satisfaction perceptions are according to pre-determined expectations in terms of product performance (Tseng et al., 2024).

The Expectation Confirmation Theory (ECT), originally proposed by Oliver (1980), has become a foundational framework in consumer behavior research,

particularly for understanding post-adoption satisfaction in digital services. In the context of this study, ECT is applied to examine how Sudanese mobile banking users, particularly those using the Bankak application from the Bank of Khartoum, form satisfaction judgments based on a comparison between prior expectations and actual service performance. Specifically, the theory helps explain how the alignment (or misalignment) between expected service quality and the perceived value received contributes to customer satisfaction. Drawing from the core ECT constructs expectations, perceived performance, confirmation, and satisfaction, this research establishes that Customer Value operates as a crucial intermediary, translating the confirmation of expectations into a sense of satisfaction (Chong et al., 2025).

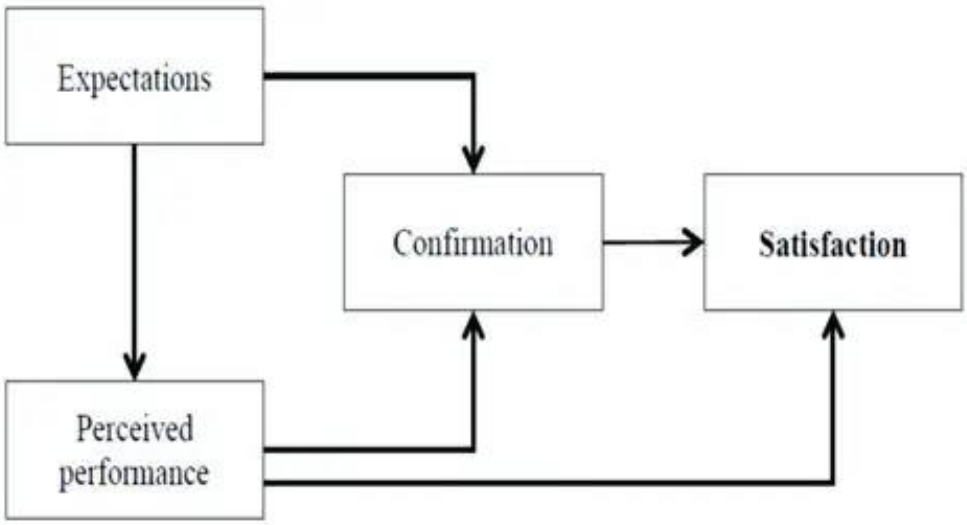

Figure 2. 3 ECT Model of Satisfaction

Source: Puneett Bhatnagar & Anupama Rajesh (2025)

In line with Oliver's model, the findings indicate that when mobile banking users perceive that the Bankak service meets or exceeds their expectations, especially in terms of reliability, usability, and support, positive confirmation occurs, enhancing their perceived Customer Value. This perceived value, in turn, significantly contributes to their Customer Satisfaction, reinforcing ECT's relevance in digital service evaluations. Particularly in Sudan's post-conflict banking environment, where expectations around digital services are often shaped by uncertainty and prior service disruptions, confirmation mechanisms become

even more vital for understanding user satisfaction. The interplay between expected benefits (ease of use, transaction security) and actual service delivery quality helps illuminate how value perception is formed and how it influences satisfaction outcomes (Siddig et al., 2024).

However, ECT is not without limitations, particularly when applied to volatile and crisis-affected environments like Sudan. A primary critique is that ECT assumes a relatively stable expectation-performance relationship, which may not fully capture the fluid and emotionally driven expectations of users navigating digital services in post-conflict settings. In such contexts, expectations may be shaped not just by prior service use but by trauma, social instability, and urgent needs for financial access. This challenges ECT's traditional assumption that users form expectations based solely on rational, prior experience. Moreover, ECT may underrepresent the influence of contextual factors such as service interruptions, digital literacy gaps, and the absence of institutional trust, factors which can distort both expectation formation and confirmation appraisal Siddig et al., (2024). Recent studies Tseng et al., 2024; Chong et, (2025) have called for an expanded ECT framework that integrates emotional and environmental variables, especially when applied in developing or crisis-prone economies. Such integration would enhance ECT's explanatory power by acknowledging the non-linear and dynamic nature of customer expectations in uncertain environments. In this study, although ECT provides a strong theoretical foundation to link customer value and satisfaction, its utility could be further enhanced by incorporating elements from Perceived Risk Theory, Resilience Theory, or Service Recovery Models. These additional lenses may offer richer insights into how users derive satisfaction in contexts where service reliability and institutional continuity cannot be assumed (Guest et al., 2024).

2.1.3 SERQUAL Theory, by Parasuraman, Zeithaml, and Berry (1998)

The E-Service Quality construct has evolved from traditional service quality frameworks, notably the SERVQUAL model developed by Parasuraman, Zeithaml, and Berry (1988), which identifies five key dimensions of quality: tangibility, reliability, responsiveness, assurance, and empathy. In the context of digital

banking, such as the Bankak mobile application by the Bank of Khartoum, these dimensions are adapted to assess customer perceptions of service delivery through digital interfaces. This study applies the SERVQUAL framework to measure how well the bank's mobile service performs across these dimensions and how they collectively influence Customer Satisfaction Militina & Achmad, (2020). Tangibility, while traditionally referring to physical facilities and equipment, in digital banking encompasses the user interface design, visual appeal, and ease of navigation. A clean, intuitive interface increases the perceived professionalism and credibility of the bank. Reliability reflects the system's ability to consistently perform transactions accurately, such as successful transfers or timely balance updates. In post-conflict contexts like Sudan, reliability becomes paramount, as customers may have limited alternatives or reduced tolerance for digital service failures Morsi, (2023). Responsiveness, in the e-banking context, refers to the bank's ability to provide timely and effective support, such as prompt replies to queries, system updates, and assistance during app malfunctions. Assurance captures user perceptions of the platform's security, privacy, and competence of the institution, directly influencing user confidence in the safety of digital financial interactions. Empathy represents personalized service aspects, including multilingual support, understanding of customer needs, and sensitivity to the challenges faced by users in underserved or high-risk areas (Makki Hanafi & Alfadil Yahia, 2022).

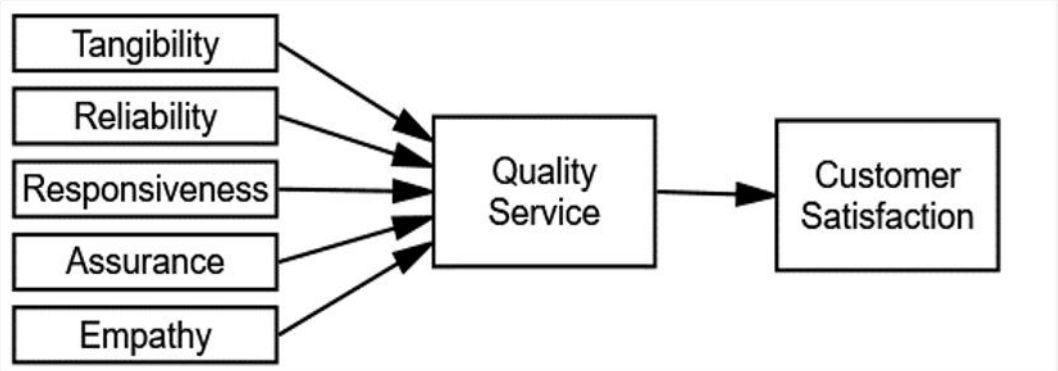

Figure 2. 4 SERVQUAL Model Dimensions and Definitions

Source: Bhatnagar, P., Rajesh, A., & Misra, R. (2024)

Findings from this study indicate that while all five dimensions contribute to the overall perception of e-service quality, reliability and assurance are particularly critical in driving customer satisfaction in Sudan's fragile economic environment. These dimensions reduce perceived risk and foster digital trust, especially when users rely heavily on mobile banking for everyday financial needs. The multi-dimensional nature of e-service quality ensures that satisfaction is not determined by one factor alone, but by a holistic service experience that blends functionality, security, and emotional reassurance (Morsi, 2023).

Table 2. 1 SERVQUAL Model Dimensions and Definitions

Dimensions	Definitions
Tangible	Appearance of physical facilities, equipment, communication, materials, and personnel
Reliability	The ability of the service provider to perform the promised service dependably and accurately
Responsiveness	The willingness to help customers and provide prompt service
Assurance	The knowledge and courtesy of service providers and their ability to convey trust and confidence
Empathy	Caring and individualized attention that the service provider provides to each customer

Source: Shao, Z., Zhang, L., & Li, X. (2023

Nonetheless, the SERVQUAL-based e-service quality framework faces limitations in fully capturing the dynamic nature of digital experiences. First, the model was originally designed for traditional services and may not adequately reflect system-specific variables such as load times, downtime frequency, or integration with other digital services. Second, it does not explicitly incorporate user-specific factors like digital literacy, internet accessibility, or mobile device limitations issues that are especially relevant in developing regions like Sudan. Moreover, the five dimensions may need contextual adaptation; for instance, empathy in digital services might involve AI-driven chatbots rather than human interaction. To enhance its applicability, future studies might consider integrating e-SERVQUAL or WebQual models, which extend SERVQUAL into online and mobile contexts. Alternatively,

combining SERVQUAL with Technology Acceptance Models (TAM) or User Experience (UX) frameworks could offer a more comprehensive view of how digital service quality translates into customer satisfaction (Haza Fatikah & Albanna, 2022).

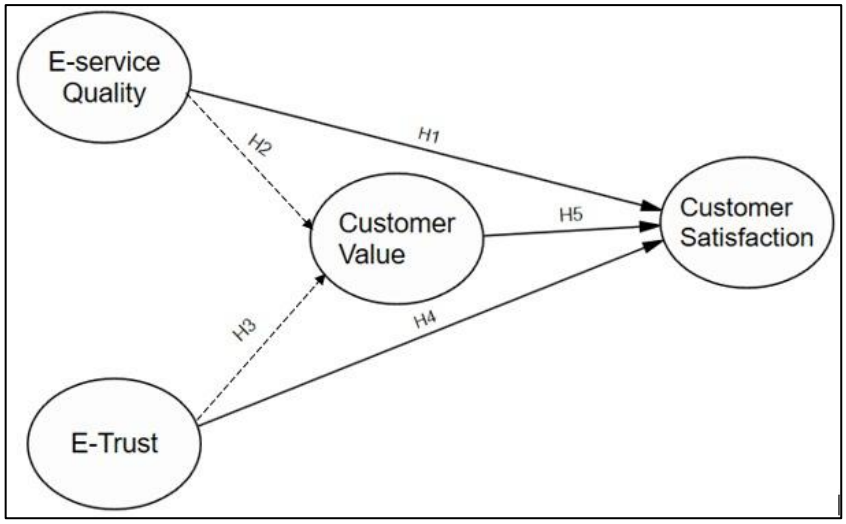

Figure 2. 5 Theoretical Framework

Source: developed by the author, 2025

2.1.4 Research Gaps

The following are the summarized findings of previous studies related to this study that used an integrated model of TPB, SERVQUAL, and ECT, and the relation OF customer satisfaction

Table 2. 2 Research Gaps

No	Authors	Summary of Findings	Research Gap
1	Khan et al. (2025)	Applied TPB to examine digital banking trust and its impact on user satisfaction in Pakistan.	Did not integrate SERVQUAL or ECT dimensions; overlooked service quality and expectation confirmation.
2	Raza et al. (2024)	Used SERVQUAL to evaluate mobile banking service quality in the UAE; satisfaction was measured based on performance.	Did not examine user expectations or trust perceptions in service engagement.
3	Al-Hawari (2024)	Explored e-trust as a predictor of satisfaction using TPB in e-banking within the UAE.	Did not incorporate SERVQUAL or ECT constructs; missing service delivery and confirmation-based insights.
4	Aly & Ahmed (2025)	Applied SERVQUAL to study mobile service quality on satisfaction in Egypt.	Lacked integration with behavioral models like TPB or confirmation processes from ECT.

5	Beanning (2024)	Evaluated e-service quality in driving satisfaction and loyalty using SERVQUAL in Indonesia.	Did not explore mediating roles of trust or expectation confirmation.
6	Tedjakusuma (2025)	Incorporated perceived value in modelling satisfaction from e-service quality.	Focused on value as a mediator but did not explicitly adopt TPB or ECT.
7	Iriani et al. (2024)	Examined ride-hailing satisfaction through SERVQUAL, emphasizing empathy and assurance.	Context differs from digital banking; trust and behavior intention models are not applied.
8	Bashir et al. (2025)	Found that service quality indirectly influences satisfaction through customer value in Bangladesh.	Did not test behavioral intention (TPB) or expectation confirmation directly.
9	Saleem & Saeed (2024)	Trust enhanced value and satisfaction in e-commerce; indirectly applies ECT logic.	Did not incorporate SERVQUAL explicitly; e-commerce context differs from mobile banking.
10	Widodo et al. (2024)	Reported that customer value strongly influences satisfaction using SEM in café settings.	No behavioral framework (TPB) or ECT constructs used; limited digital financial service focus.

Source: Processed by author

2.2 Conceptual Framework

2.2.1 Mobile Banking

The mobile banking service is a development of the two previous forms of innovation: Internet-based technology is used in both types of banking Darmawan, (2024). Mobile banking is a banking channel that allows customers, clients, or account holders to conduct banking transactions or engage with the bank via various financial services via their mobile devices. Customers will be more interested in utilizing mobile banking if the system is simple to understand and operate(Fathoni et al., 2024).

Banking Services are defined as any activities involved in accepting and safeguarding money in different forms owned by other individuals and bodies, and then loaning out this money to earn a profit Heriyati et al., (2025). For SW Kelley, the competitive nature of the banking business is responsible for increasing the customer orientation of the service employees, as it is a direct and one of the most important approaches to assuring customer satisfaction. The banking sector has undergone a dramatic shift in the last decade due to existing technology that has taken a great hold of the financial industry, bringing on board E-banks. E-service quality and e-trust have, therefore, emerged as key influencers of customer satisfaction and value, especially in conditions of risk and turbulence. This research seeks to establish the following objectives: The role of e-service quality and e-trust on customer satisfaction and customer value during crisis recovery: a study of the Bank of Khartoum, Sudan (Broby, 2021). In recent years, Sudan has experienced several political and economic challenges that have continued to affect its financial sector and numerous banking and financial institutions. Customers rely on online banking solutions during such stressful periods for their payment needs, savings, and other basic banking operations. Thus, the high-quality delivery of digital services and building client trust can be critical to bank customer retention. Sudan is considered in this research since the BOK is amongst Sudan's premier banking institutions, and the research herein examines how e-service quality and e-trust may be utilized in crisis recovery decision-making to reconstruct customer relationships (Omer et al., 2021).

Thus, this research is important for several reasons. First, it emphasizes the assessment of the customer behavior of Bank Khartoum: how it changes during the crisis periods when customers' expectations often diverge from the non-crisis ones. Second, it offers some ideas on how banks in developing and crisis-sensitive economies can continue their banking services and client base with the use of digital technologies. Lastly, this study seeks to add to the existing body of knowledge regarding the part played by digital banking in increasing customer value satisfaction during periods of market instability (Liu et al., 2020).

2.2.2 E-service quality

E-service quality, according to Parasuraman, Zeithaml, and Malhotra (2025), is the website's capacity to efficiently and successfully support transactions, delivery, and shopping. From the pre-purchase process (product information, ordering details, convenience of use, and security of personal data) to the post-purchase process (shipping and return policy), this comprehension clarifies the idea of e-service quality. According to Ladhari (2022), the following metrics are used to gauge the quality of e-services: (1) One of the primary dimensions in conventional service quality instruments is reliability fulfillment, which refers to service performance that precisely and promptly fulfills commitments. (2) The eagerness to assist customers or users, the prompt resolution of customer inquiries and issues, and the availability of alternate lines of communication offered by the website are all examples of responsiveness. (3) Usability, which makes it simple to retrieve information that already exists (Kumar et al., 2024).

According to Ojasalo (2024), Customers' overall assessments and views on the quality of service in the virtual marketplace are known as e-service quality. E-service quality in an e-commerce setting includes the entire customer experience, including pre-purchase assessment, product purchase, and post-purchase activities, according to Piercy (2023) and Shi et al (2022). According to them, customers expect a certain degree of e-service quality when they engage in various online activities, such as information seeking, product searching and selection, purchase, and feedback sharing, since its existence can have a significant influence on their level of satisfaction. This aligns with recent research by Rita, Oliveira, & Farisa

(2023). This demonstrates that higher e-service quality increases customer happiness and retention, which in turn increases brand loyalty. For measuring and assessing service quality, the SERVQUAL model created by Parasuraman, Zeithaml, and Berry in 1988 has mainly been utilized in scholarly works. The five characteristics of service quality that are estimated by this approach are tangibles, assurance, responsiveness, empathy, and dependability. Measures of service quality have been introduced over time, such as convenience and security (S. O. Ighomereho et al., 2022).

E-service quality is a multi-dimensional concept that determines user satisfaction significantly. Nevertheless, there has been a different effect of the various e-service quality dimensions on e-satisfaction according to the studies. To provide an example, ease of access, free user interfaces were found by some researchers, including Yoo and Donthu (2024), to contribute much more to the level of e-satisfaction. Other studies, such as that of Aji et al. (2024), on the other hand, stated that e-accessibility does not largely influence satisfaction, hence indicating that other variables could be having an even greater influence. Likewise, the effectiveness and quickness with which support services are delivered tend to affect e-satisfaction in a positive way Anderson & Srinivasan, 2022). But there are contradictory results, as some of them suggest that the contribution of the support services to satisfaction may even be insignificant when the other dimensions of the service quality still require improvement (Lin et al., 2023). Related and correct information, in addition to good quality information at all times, improves e-satisfaction Van Riel et al (2023). Other studies, however, believe that information quality cannot be used to satisfy customers on its own without accompanying other favorable service factors (Alnaim & Sobaih, 2022).

2.2.3 E-trust

According to Mayer, Davis, and Schoorman (2022), e-trust is "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control the other party." In a previous effort, Ba, Whinston, and Zhuang (2023), as reported in Taddeo (2024), defined e-trust as occurring in

settings where interactions are conducted via digital devices, where moral and social effects might be interpreted differently, and where there is no physical touch. Although this concept is informative, it is too general since it does not describe a specific context, including all digital worlds (Haza Fatikah & Albanna, 2022).

According to the research by Saoula et al. (2023), e-satisfaction is increased thanks to e-trust, and Saoula et al. are correct. However, according to Soleimani (2022) provides a counter perspective is provided, estimating that, apropos e-trust, the region, and the e-service quality component can determine its impact. E-trust is very virtual: it usually serves as a mediating variable in the link between e-loyalty and e-service quality Kuswanto & Syah, (2021). Other studies, like the cross-market e-commerce study (2023), indicate that e-loyalty can be affected directly by E-trust, avoiding the E-satisfaction factor. Several of these studies fall short of adequately explaining the contradictory conclusions reached. It is vital to remember that E-service is an industry with diverse requirements and characteristics, so the effect of its quality may differ; for example, in the public sector, e-commerce strategies might not yield great tangible results Chan et al., (2022). Misalignment in the measurements of e-service quality, e-satisfaction, or e-trust can account for differences in a research's outcomes. The relationship between these constructs may even yield different results due to the constructs being measured on different scales or through different lenses (Parasuraman et al., 1985). Depression or cultural differences can impact user experience; different users expect and desire different facets of an e-service, all of which can create opposing results Salinas-Perez et al., (2024). E-service quality, e-satisfaction, and e-loyalty remain highly controversial subjects, as a large body of conflicting evidence exists on the issue. These discrepancies highlight the need for more context-specific research and standardized measurement approaches. Such understanding is vital for enhancing the provision of e-services, especially in the case of the bank sector, where users' contentment and trust are paramount for achieving such services (Alnaim & Sobaih, 2022).

2.2.4 Customer Value

Customer value is the relative preference for a strong customer-specific product or service feature assessed subjectively Sánchez-Fernández & Iniesta Bonillo (2023). Efficiency, quality, prestige, respect, play, aesthetics, ethics, and spirituality are all examples of this value. According to Lapierre (2022), the idea of customer value gives a general idea of a business that considers what consumers want and thinks they would benefit from a product they may purchase. According to Teas and Sanjeev (2023), customer value is negatively impacted by price increases that cause the consumer to make more financial compromises they indicated that Customer Value is a multidimensional construct central to marketing and management literature, defined as the perceived trade-off between the benefits a customer receives and the sacrifices made to obtain a product or service Zeithaml, (2021). It is a foundational concept influencing consumer decision-making, satisfaction, loyalty, and long-term profitability (Marliyah et al., 2021).

Customer value refers to the customer's overall assessment of the utility of a product or service based on what is received (benefits) versus what is given up in costs Zeithaml, (2022). It encompasses the perceived benefits that a customer gains from a service or product relative to the sacrifices they make, including time, money, and effort. In the context of e-services and digital banking, customer value can be further broken down into several dimensions: The practical or utilitarian benefits of using the service, such as ease of use, reliability, and efficiency. Emotional Value: The affective benefits, including feelings of trust, security, and satisfaction that customers experience. Social Value: The benefits related to the social interactions and status associated with using the service. Economic Value: The cost-effectiveness and financial benefits, such as savings on time and money, that customers perceive. So many studies emphasize that e-service quality dimensions, usability, security, and responsiveness, enhance trust and satisfaction through customer value. For instance, Kassim and Abdullah (2020) found that e-service quality strongly influenced satisfaction and e-trust, mediated by customer value in both Malaysian and Qatari contexts (Kassim & Abdullah, 2021). Conversely, Rita et al. (2023) argued that some dimensions, such as customer service, did not significantly impact overall e-service quality or satisfaction.

According to Rita et al. (2022). This weakens the customer value's mediating role, highlighting the inconsistency of service quality's impact across dimensions. Al-Bashayreh et al. (2022) emphasized that e-trust enhances the mediation process by fostering confidence in e-service quality, thus improving satisfaction through customer value (Al-Bashayreh et al., 2022).

However, Hwang and Kim (2022) argued that e-trust might act independently of customer value. They found that perceived web quality directly influenced e-trust and satisfaction without relying heavily on value mediation Hwang & Kim, (2023). Research shows that customer value effectively mediates the relationship between e-trust and e-service quality and satisfaction. For example, studies in e-tourism settings found that perceived value amplified satisfaction when quality and trust were aligned Masri et al., (2022). In contrast, Al-were et al. (2022) noted that in contexts like youth online retailing, privacy and reliability alone sufficiently influenced satisfaction without requiring value mediation Al-were et al., (2023). Trust and quality consistently influence satisfaction across diverse cultural contexts, with customer value often serving as a bridge. For instance, Murray and Howat (2022) demonstrated this in leisure service settings Murray & Howat, (2023). However, Lin et al. (2023) highlighted that in e-commerce contexts, logistics quality might overshadow the role of e-service quality and customer value, especially in regions prioritizing delivery efficiency (Asmar & Tuqan, 2024).

2.2.5 Customer Satisfaction

According to Yuniarti (.2023), customer satisfaction is the state in which a product meets its customers' requirements, wants, and expectations. Customer happiness drives customers to stick with a product, recommend it to others, and use it consistently. A consumer's response and evaluation of their degree of satisfaction is known as customer satisfaction. Wibowo (2023) states that the following metrics are used to gauge customer satisfaction: (1) Product/service quality, or the capacity of online retailers to satisfy customers with their goods or services. (2) Price refers to how satisfied customers are with the costs and savings internet retailers offer. (3) Convenience is the degree to which customers are satisfied with the ease of purchasing online (Kumar et al., 2024).

Customer satisfaction is significantly influenced by various e-service quality dimensions, such as reliability, usability, responsiveness, and privacy. For example, Rita et al (2023) demonstrated that website design, security/privacy, and fulfillment are key predictors of satisfaction, with responsiveness being particularly impactful in online retail Rita et al, (2023). Conversely, dimensions like customer service showed weaker relationships with satisfaction in some contexts. Studies like Lin et al (2022) found logistics service quality (e.g., delivery time) to have a stronger influence than traditional e-service quality dimensions in e-commerce settings Lin et al., (2022). E-trust directly impacts customer satisfaction by reducing perceived risks and increasing confidence in service quality (Islam et al., 2023).

For example, Kassim and Abdullah (2022) confirmed that trust mediates the relationship between e-service quality and satisfaction in both developed and developing market contexts Kassim & Abdullah, (2023). However, some studies e.g., Siddiqi et al., (2021) suggested that in high-trust environments, e-service quality can directly influence satisfaction without requiring trust as an intermediary Siddiqi et al., (2021). Customer value serves as a key mediator between independent variables like e-service quality and e-trust and the dependent variable of customer satisfaction. Masri et al. (2020) found that value strengthens the perceived benefits of service quality and its impact on satisfaction in e-tourism (Masri et al., 2022). Murray and Howat (2022) demonstrated that value perception mediates service quality and satisfaction in leisure contexts Murray & Howat, (2023). Hwang and Kim (2022) noted that in technologically advanced regions, web quality alone could independently drive satisfaction, bypassing mediation by value or trust Hwang & Kim, (2023). Van Riel et al. (2024) found that reliable and relevant information enhances user confidence and satisfaction Van Riel et al., (2023). argued that information quality alone is insufficient without integration with other dimensions like responsiveness or user interactivity (Bhattacharjee, 2022).

2.3 Previous Studies

Relationship between E-Service Quality and Customer Satisfaction

The relationship between e-service quality and customer satisfaction in the banking sector has been a focus of many studies, particularly in light of technological

advancements. For instance, a Study conducted by Khashman (2023) in a study titled “Customer Satisfaction Quality in Banking Sector” aimed at identifying the factors that influence customer satisfaction in the banking sector of Jordan. Using a quantitative model based on survey data from 250 customers, the study analyzed aspects of customer satisfaction such as reliability, technology, assurance, and security. It was noted that reliable and secure services have a great influence on customer satisfaction, especially if the processes are free of any deferred error and the electronic platforms are strong. While the study offers valuable insights, its reliance on self-reported data may limit its applicability across different contexts. another study conducted by Hammoud et al. (2023) explored the effect that the e-banking service quality has on customer satisfaction in Lebanon. Their research, titled The Impact of E-Banking Service Quality on Customer Satisfaction, utilized surveys on 302 subjects and combined them with the Structural Equation Model to analyze the results. Various dimensions, like reliability, efficiency, security, and ease of use, were evaluated, and it was found that out of these, reliability had the highest influence on satisfaction. The study recommended that providing a competitive edge to the banks by considering improving the mentioned dimensions could enhance customer satisfaction levels. However, such a focus on the region can limit its applicability to the banking systems in other countries. In the Kingdom of Saudi Arabia, there is a study undertaken by Alkhaibari et al. (2023) in the paper The Impact of E-Banking Service Quality on Sustainable Customer Satisfaction in Saudi Arabia studied similar themes. This study, in contrast, used a mixed methods approach and used 308 banking customers' evaluations on the following dimensions: transactional efficiency, customer support, and service content of the e-services. The findings were clear: the dimensions do have a positive impact on customer satisfaction, hence providing efficient e-services is paramount for the banks. While the study properly addresses the issue of service quality and its role in providing sustainable satisfaction, it would be prudent to increase the scope of the geographical locations sampled for the study.

In Indonesia, Jaiwani et al. (2022), a study carried out in Indonesia looked into several dimensions of e-service quality within the banking sector, namely security, ease of use, and responsiveness. The authors utilized a systematic,

structured survey involving several regions where e-agriculture is still at a nascent stage and concluded that all three dimensions affect customer satisfaction tremendously. The authors pointed out that security and ease of use, for instance, are imperative in environments where the penetration of technology is low, and thus user interfaces and security mechanisms must be smartly designed. At the same time, the study showed that some dimensions' importance can be affected by a cultural context and lack of infrastructure, which suggests the need for specific strategies of an e-service design in the target area of focus. Ataguba et al. (2023) investigated the relationship between the quality of e-banking services and customer satisfaction in Sudan. Their research focused on the amalgamation of service quality characteristics, namely, customer care service quality, transactional efficiency, and relevance of the service content. Their products were well-tailored, such that they took into consideration the geography of the target clientele. Findings from their survey indicated that the banking services provided in Sudan's e-banking sector have low appeal. Banks do need to construct educational campaigns aimed at fostering trust and usage of e-banking services. The e-service quality and customer satisfaction, influenced heavily by geographical, technological, and infrastructural factors, exist in a delicate balance, which these case studies illustrate. As an example, while the safety and dependability aspects of a service have emerged as pivotal for many regions, various other factors such as trust and even cyber literacy tend to dictate the significance. Hence, to fulfill the varied expectations spread across different regions, a varied approach for the enhancement of e-service quality in the banking industry should be taken.

Relationship between E-Trust and Customer Satisfaction

Based on recent research, the relationship between e-trust and customer satisfaction in the banking sector has been explored in various countries, emphasizing regional contexts and specific factors that enhance or challenge these dynamics. The study by Khashman (2023) examined customer satisfaction in the Jordanian banking sector, focusing on the role of trust and service quality. While the research highlighted that dimensions like reliability, security, and technology significantly influence satisfaction, it lacked depth in addressing how these factors interact dynamically in a competitive banking environment. The study is restricted in terms

of the generalizability since only 173 responses were valid, and the overall sample size could have been employed. The results highlighted the role of error-free services and strong security as a key driver, but the research did not dig further into the impact of customer perception of trust regarding the digital innovation that is important in contemporary banking. Ahmed et al. (2021) have studied satisfaction and loyalty in e-banking in Pakistan in the context of the Islamic banking industry using a highly developed methodology based on a modified E-SQ-UAL model and second-order PLS-SEM. Although adding religiosity as a mediator provided a new cultural insight into the study, the results either corroborated the various literatures available on trust as a mediator of customer satisfaction and loyalty. The research was based more on controlled survey information than real-life data of 674 respondents, and despite its statistical reliability, it cannot reveal deep parts of the reality of trust-building in various banking realities. There is, moreover, an intrinsic limitation to the generalizability of the study towards the e-banking trends since the study is focused on Islamic banking, which is a culturally specific banking trend. Its focus on such trust-based activities as service reliability and personalization was insightful, although it could have used further consideration about how such efforts can have a direct conversion into competitive advantages. The mediating role of trust between customer satisfaction and mobile banking ecosystems was afforded a slight distinction in another study by Geebren et al. (2021) that focused on emerging economies. The advantage of the study was the investigation of trust as a positive and partial mediator, which showed the importance of structural assurance and quality of service in improving satisfaction indirectly. However, its findings were derived from 659 responses, and while these results are statistically significant, the study might have benefited from qualitative insights to contextualize trust-building strategies. Furthermore, the study focused on post-adoption behaviors, leaving a gap in understanding how initial trust is established and sustained in markets with varying levels of digital literacy and banking accessibility.

Recent studies emphasize the critical role of e-trust in enhancing customer satisfaction and the quality of banking services in Europe. Drugă (2024) found that trust, particularly in dimensions like integrity and ability, significantly influences satisfaction and loyalty in Romania, recommending transparency and improved

customer service as key measures Drugă, 2024). Similarly, Cardoso and Cardoso (2024) highlighted that trust, combined with a strong bank reputation, drives satisfaction and loyalty among Portuguese clients Cardoso & Cardoso, (2024). However, Cabeças and Santos (2021) noted that despite efforts to rebuild trust in Portugal post-financial crisis, gaps in service quality still hinder customer satisfaction (Cabeças & Santos, 2021). In Greece, Bekiris (2022) demonstrated that while ease of use and technological trust during COVID-19 positively impacted satisfaction, privacy and personalization were less significant factors Bekiris, (2022). Collectively, these findings underscore the importance of trust, transparency, and user-friendly services in fostering customer satisfaction and improving banking service quality in Europe.

Study in Sudan sector by Hassan and Saeed (2020), in their study entitled, The Role of Electronic Service and Pricing in Attracting Customers, explored the responsibilities of e-service and electronic pricing in augmenting trust and satisfaction of clients towards the Sudanese banks. In the study, it was emphasized how it is important to fulfill the need for safe and credible electronic banking services that will facilitate the growth of trust between the company and its customers. The latter concluded that modern software, payment security, as well as minimization of risks of data leaks, should be implemented by banks to increase satisfaction and trustworthiness. Nonetheless, the paper observed that the use of its results is restricted due to the absence of an elaborate technology infrastructure. Lim et al. (2023) tested customer satisfaction with the e-banking services in Malaysia, based on the relationship between trust in satisfaction, and loyalty. The E-S-QUAL model was applied, and a survey was conducted among 138 respondents to find the importance of security, privacy, and reliability affecting the trust and, hence, satisfaction. In contrast to research in other settings, the concept of efficiency did not become a leading one, as it might be related to the fact that Malaysia already had developed a digital banking system. Although the research gave a sound foundation on how to understand trust in e-banking, it is limited to its small sample and concentrated results. E-trust in digital banking has been a centre of study in Indonesia.

A study by Firmansyah et al. (2022) enquired into the effects of e-trust and e-service quality towards achieving customer satisfaction and loyalty in the banking industry of Malang City. The study showed that customer trust in online banking services positively influences satisfaction, leading to higher loyalty, particularly during the COVID-19 pandemic. Similarly, Ramadania (2021) analyzed the impact of core online service quality (E-S-QUAL) on satisfaction and trust among Indonesian banks' customers. The findings confirmed a strong link between satisfaction and trust, underscoring the importance of secure and efficient e-services. Both studies highlight the critical role of trust, though their focus on specific cities may limit broader applications. In Egypt, Agag and El-Masry (2021) studied trust in the context of online travel and banking services, finding that trust is a significant mediator between perceived quality and satisfaction. The study emphasized the need for reliable services and user-friendly platforms to build trust and satisfaction in emerging markets. Although their work was not exclusively about banking, its implications for digital trust in transactional platforms remain relevant.

The mediating effect of Customer Value on the Relationship between e-trust, e-service, customer value, and Customer Satisfaction

The mediating effect of customer value on the relationship between e-trust, e-service quality, perceived value, and customer satisfaction has been explored in several African contexts, with studies offering critical insights. In South Africa, a Study undertaken by Mtotywa and Kekana (2023) examined how e-service quality and customer satisfaction influence purchase intentions in online shopping. The study revealed that customer satisfaction fully mediates the relationship between privacy, compensation, and purchase intention and partially mediates the effects of efficiency and responsiveness on purchase intention. This emphasizes that while e-service dimensions contribute to satisfaction, customer value in the form of satisfaction plays a central role in translating these elements into customer loyalty and intention. However, the study's focus on non-banking online shopping limits its direct applicability to banking sectors, leaving room for further investigation in financial services. Another study conducted in Nigeria by Ayo et al. (2022) investigated the role of perceived value as a mediator between e-trust and e-loyalty

among e-banking customers. The findings indicated that customer-perceived value significantly enhances the impact of e-trust on satisfaction, which in turn fosters loyalty. This study highlights how perceived value bridges e-trust and satisfaction, particularly in contexts where trust-building is critical due to infrastructural or institutional gaps. However, the study primarily analyzed urban banking customers, suggesting that rural banking contexts might exhibit differing dynamics due to lower technological adoption. In Egypt, Ahmed and El-Masry (2021) explored the mediating role of perceived value in digital transaction platforms, including online banking. They found that perceived value strengthens the relationship between e-service quality and customer satisfaction, particularly when trust factors like reliability and security are enhanced. This aligns with global trends but also points to addressing localized barriers to trust in developing markets. The study's limited sample size and focus on a single metropolitan area, however, limit its broader applicability across Egypt's diverse banking demographics.

CHAPTER III

RESEARCH METHODOLOGY

For Determinants of Customer Satisfaction Toward Mobile Banking: A Case Study of Bank Khartoum in Sudan, the purpose of this chapter was to provide the required instruments and procedures for gathering and analyzing the data. As a result, the first part of this chapter included a description of the demographic and the data-gathering process. The variables selected for the study, along with their corresponding measures, are listed in the section that follows. The pilot study's findings were presented in the third portion, and the SEM-PLS model is showns in the last section (Abdel-gadir & Billah, 2025).

3.1 Research Object

In this study, the author employs variables consisting of exogenous and endogenous variables as follows:

Exogenous Variables

a. E-Service Quality (From SERVQUAL)
b. E- Trust (From TPB)

Endogenous Variables

a. Customer Value (From ECT)
b. Customer Satisfaction (From ECT)

3.2 Research Method

Quantitative research method supported by Structural Equation Modeling (SEM) is the approach utilized in this research with the help of SmartPLS 4.1.1.2 software. The strategy is appropriate to study complicated causal links between several latent factors, especially in a case where the theoretical concepts E-Service Quality, E-Trust, Customer Value, and Customer Satisfaction were combined into a study model. Quantitative methods are attributed to focus on objectivity, numerical data, and statistical analysis with the intention of testing hypotheses and coming up with generalizable results. According to Hamadou et al. (2024) Propose that the quantitative method is the one to use when one wants to comprehend behavioral

patterns of a given individual or group by taking a representative sample of a larger population, and using an instrument that collects data in a structured manner, a questionnaire usually being the most widespread representative of such instrumentation. In the development of a structured questionnaire in this research, the constructs were supposed to be theory-based works like the Theory of Planned Behavior (TPB), SERVQUAL, and Expectation-Confirmation Theory (ECT). With the SEM-PLS method, validity of the measurement as well as significance of the structural model is estimated simultaneously, thereby permitting the researcher to determine both direct and indirect influence of the variables, hence an effective structure for determining the determinants of customer satisfaction in mobile banking services at the Bank of Khartoum (Yadollahi, 2024).

3.3 Research Design

The study employs a hypothesis testing design to examine the relationship between variables. This design aims to test specific hypotheses regarding the correlation between variables, without implying causality or differences between two or more variables. The objective of this study is to investigate the influence and connection between the researched variables. This design, the study intends to determine whether statistically significant relationships exist among the variables and how these relationships align with or differ from existing literature, particularly in conflict-affected and developing economies such as Sudan Henseler et al., 2022).

3.4 Population And Sample of the Study

3.4.1 Population

The population for this study comprises customers who actively maintain financial accounts with the Bank of Khartoum, Sudan, and who frequently utilize its digital financial services, such as mobile banking and web-based platforms. The 18 states that make up Sudan are typically divided into four microregions: the North, East, South, and West. Because of their comparatively higher levels of economic activity, population density, and digital infrastructure, these regions were the focus of the study. Crucially, this study was carried out amid a national emergency characterized by disruptions in essential services, political unpredictability, and economic uncertainty. These conditions have had a direct impact on access to banking

infrastructure, especially in underserved or conflict-affected regions. As a result, the population was limited to users in urban areas with active banking operations and some degree of digital accessibility. This focus enabled the study to assess digital service performance and customer trust during times of systemic vulnerability, making the insights particularly relevant for understanding service resilience under crisis conditions (Allagabo et al., 2024).

Figure 3. 1 Sudan regions location

Source: Al Jazeera. (2023, April 17)

3.4.2 Sample

The sampling strategy employed in this study was purposive, aiming to recruit information-rich respondents who could provide meaningful insights into their experiences with the Bank of Khartoum's digital services. ten major cities were selected across the four macro-regions of Sudan: North, East, South, and West. These regions were prioritized due to their high population densities, economic relevance, and the operational presence of the Bank of Khartoum in major urban centres. Central Sudan, although economically significant and home to the capital, was intentionally excluded from the sample. This decision was based on the fact that Central Sudan was comparatively less affected by the ongoing conflict and systemic disruptions. In contrast, the selected regions (North, East, South, and West)

experienced more pronounced impacts of the crisis, including disruptions in banking access, public services, and digital connectivity. Focusing on these regions allowed the study to better capture the dynamics of customer trust, satisfaction, and service performance under crisis conditions, a key aim of this research. To address access and participation barriers, especially in areas with limited internet connectivity and digital literacy, local facilitators were recruited and trained in each of the selected cities. These facilitators supported the distribution and clarification of the questionnaire in both online and offline formats. Their presence helped build trust, overcome logistical challenges, and ensure that responses reflected diverse user experiences across the regions. In total, 266 valid responses were collected, exceeding the minimum threshold required for Structural Equation Modelling (SEM). While purposive sampling limits generalizability, the combination of geographic diversity, regional relevance to the crisis, and contextual adaptation enhanced the credibility and analytical depth of the findings.

The minimal sampling theory developed by Hair et al. (2024) is used to forecast the study's sample size. He claims that doubling the number of items by five to ten yields the lowest sample size. Consequently, because we have 24 items, 24 * 10 equals 240. As a result, 240 responders were the minimal sample size. Thankfully, 280 replies were received, 266 of which were usable, and 94% of respondents gave a rating. As a result, this figure exceeds the minimum sample.

$$\boldsymbol{n = number\ of\ indicators \times 10}$$

$$N = 24 * 10 = 240$$

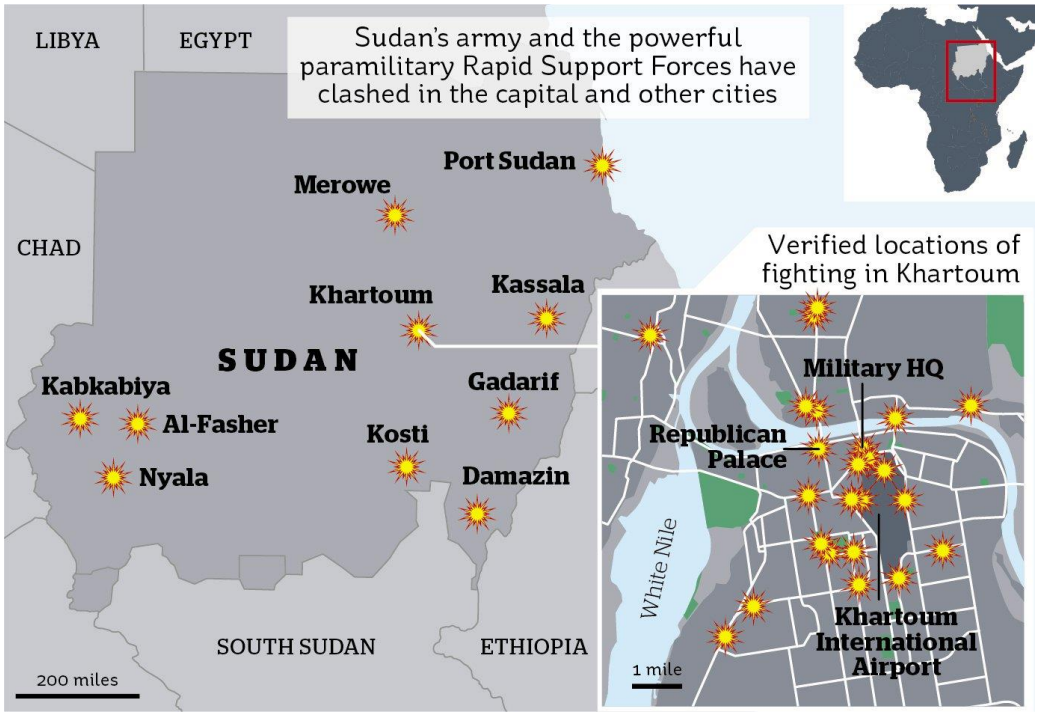

Figure 3. 2 Conflict-Affected Cities in Sudan (2023)

Source: BBC News. (2023, April)

3.5 Instrumentation and Data Collection Method

3.5.1 Data Collection

Due to the nature of the data, two distinct sampling techniques were used in the collection process: convenience sampling and online sampling. The convenience samples served as the narrative for the online samples. This is the sampling strategy used in research in the great majority of cases. The survey started with a section that included questions aimed at the respondent's demographic characteristics. This section followed the introduction right away. To make it easier for the responders to understand, this questionnaire was translated into Arabic (Yolanda & Handayan, 2024).

3.6 Research Instrument

This instrument was developed using a Likert scale. This scale, also known as a summated scale, which is a scale that is often used in social science, mainly measures a person's attitudes. As time develops, scale. This can be used to measure opinion, personality, describe the life or environment of somebody, emotions, personal needs, and depict work. By using a Likert scale, the variables being measured are described in the form of indicators and measurements. Next, the size of the indicator was lowered in the form question, which was answered by respondents. In this study, the author utilizes a 5-point Likert scale.

According to Hertanto (2022), the advantage of a questionnaire instrument employing a 5-point Likert scale is its ability to accommodate responses from respondents (Islam et al., 2023).

Table 3. 1 Scale Measurement

Statement	Score
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

processed by author (2025)

3.7 Data Analysis Technique

To achieve the research objectives, the data collected from the respondents were analyzed using Structural Equation Modeling (SEM) with Partial Least Squares (PLS) methodology. The analysis will be conducted using the software SmartPLS, which is suitable for exploratory research and models involving multiple constructs and relationships (Beanning, 2024)

3.7.1 Descriptive Statistics Analysis

Descriptive statistics is an essential means of summarizing and organizing data to explain something about a sample group Harbison & Simmons, (2024). Measures of central tendency, such as mean, median, and mode, are used to describe the characteristics of a dataset (Harbison & Simmons, 2024). Descriptive statistics tell the story of the data and can reveal patterns, even though they cannot make conclusions beyond the analyzed dataset or hypothesis testing (Al-hawari, 2023). In this study, descriptive statistics of the data were analyzed to summarize the demographic profiles of the respondents, including age, gender, educational background, and career aspirations. This first step clearly defined the characteristics of the sample. Hence, the respondents match up with the target population of Bank Khartoum, who are either studying Islamic economics in higher education or alumni of Islamic economics in higher education.

In addition, descriptive statistics presented an overview of some key variables in the study, including the distribution of responses across constructs like attitudes, subjective norms, perceived behavioral control, basic psychological needs, and alignment with the Bank of Khartoum. Identification of such patterns is crucial for

identifying the prevalence of some motivational factors or the level of agreement with some statements referring to the ECT, SERQUAL, and SDT. Additionally, it made sure to catch any anomalies in the data or inconsistencies in the data that needed to be fixed before moving on to more complicated analyses Reddy et al., (2024). An identification of the descriptive analysis laid the groundwork that allowed this study to build toward subsequent hypothesis testing and the structural model evaluation. For instance, when comparing demographic subgroups (such as students vs non-students) to see some interesting ways in which attitudes or motivations vary among different demographic subgroups, expanding the depth of the analysis (Widodo et al., 2023).

3.7.2 Measurement Model Evaluation

Evaluation of measurement models in SEM-PLS is an important step to ensure that the construct of a model is valid and reliable. The evaluation of the structural model requires the evaluation of reliability and validity criteria before proceeding to the evaluation of the structural model (Beanning, 2024). In this process, the measurement model or the outer model is assessed to make sure the constructs are represented by the indicators. It is important to distinguish between formative and reflective models because misspecification results in inaccurate results. Indicators in reflective models are a representative set of things that, taken together, represent the latent variable being measured. The reflective model posits that indicators can be substituted for one another and that the omission of one indicator may be unimportant since the remaining indicators are also reflective. In formative models, each indicator represents one dimension of the meaning of the latent variable. The indicators cannot be used interchangeably, and the removal of one sign in a formative model alters the meaning of the construct.

The model used in this study is reflective. The measurement model evaluation includes internal reliability, composite reliability, convergent validity, and discriminant validity (Usman et al., 2024).

1. Convergent Validity

   The degree of positive correlation between one measure and another of the same construct is known as convergent validity. The Average Variance 41 Extracted

(AVE) and factor loadings are evaluated while analyzing a measure's convergent validity in PLS (Hair et al., 2022).

a. Factor Loadings

It measures how strongly each indicator (question) is related to its construct. Strong correlations are confirmed by factor loadings above 0.7.

b. Average Variance Extracted (AVE)

The average variance shared by a construct and its measures is known as AVE (Janadari et al., 2022). According to Hair et al. (2024), it is the grand mean value of the squared loadings of the indicators linked to a certain construct, calculated by dividing the total squared loadings by the number of indicators. A construct's average variance with its measurements should be higher than that of the other constructs in the same model. The AVE computation is included in the analysis program of PLS. On average, the construct explained more than half of the variation of its indicators when the AVE value was equal to or greater than 0.50. An AVE of less than 0.50, on the other hand, suggests that there is still more error in the items than the average variation that the constructs can account for. Accordingly, it is generally accepted that an AVE value of 0.50 or above is appropriate (Broby, 2021).

2. Discriminant Validity

Discriminant validity focuses on the originality of a construct, or whether the attribute that a construct describes is different from the other constructs in the model (Hair et al., 2025). In other words, it ensures that every construct does not overlap with others. This is necessary to make sure that different constructs measure different concepts. The Fornell-Larcker criterion and the Heterotrait-Monotrait Ratio of correlation (HTMT) can be used to check the discriminant validity by looking at the cross-loadings between categories (Taqi, 2021).

Cross-loadings mean that the construct must first have high loadings on itself and low loadings on other constructs to be discriminantly valid (Ho & Tzeng, 2021) To assess a construct's second discriminant validity, it is necessary to examine the square root of the AVE values and compare them to the

associations among latent variables (Fornell & Larcker, 1981). Along the diagonal of the correlation matrix are the square roots of the AVE values. To show that a construct is discriminant, the squared root of its AVE should be higher than its best correlation with any other construct (Hair et al., 2022). Finally, the latest study by Henseler et al. (2025), which was based on a Monte Carlo simulation, added a new criterion for discriminant validity called HTMT, where the HTMT number should be between -1 and 1.

3. Internal Consistency Reliability

Reliability is a quality criterion of a construct, and a high degree of correlation between the indicators of that construct is necessary (Widodo et al., 2023). According to (Usman et al., 2024) Reliability is the extent to which a variable or set of variables measures the thing for which it is claimed. Two common metrics of dependability of constructs are Cronbach's alpha and composite reliability, according to Abubker et al., (2021). The coefficient alpha is a more conservative assessment of items and is used to estimate the reliability of the multiple-item scale. A construct has internal dependability when its Cronbach's Alpha value is 0.7 or above (Rafique & Qadir, 2024). Unlike Cronbach's alpha, which is most often used in the PLS model, composite reliability does not assume measure equivalency, i.e., that indicators are equally weighted. This assesses the reliability of the whole construct with all the indicators. Composite reliability, as described by Hair et al. (2022), is more concerned with individual dependability under various outer loadings of the indicator variables. A composite reliability value of 0.7 or greater indicates that the construct is measured consistently with its indicators, which is a good sign of construct reliability. The composite reliability cutoff is the same as for any other reliability measure (Cheung et al., 2024).

3.7.3 Structural Model Evaluation

In SEM-PLS, structural model evaluation entails the significance and the relevance of path coefficients and how the explanatory and predictive power of the model is evaluated by Hair et al. (2022). An analysis of these steps, collinearity, path coefficients, R^2, the effect size (f^2), and predictive relevance Q^2 is key in structural model assessment (Roemer & Schuberth, 2021).

1. Multicollinearity Test

There may be a structural multicollinearity issue, a condition where two or more independent variables have a strong correlation with one another, in either a reflective or formative model. In Ordinary Least Squares (OLS) regression, multicollinearity obscures the relative importance of one independent variable over another, inflates standard errors, and renders significant tests of independent variables untrustworthy Taqi, (2021). The Variance Inflation Factor (VIF) coefficient exceeding 4.0 may indicate a common value of troublesome multicollinearity. Multicollinearity is indicated when tolerance is less than 0.25 for VIF, which is the inverse of the tolerance coefficient (Hair et al., 2022).

2. Path Coefficients

Path coefficients are used to determine the strength and direction of relationships between variables (constructs) in the structural model. It shows whether the hypothesized relationships are supported by the data. The bootstrapping techniques are used to evaluate these coefficients, with the dataset resampled multiple times (for example, 5,000 times) to get standard errors and p-values. If the p-value is less than 0.05, it means that the relationship is statistically significant, so the hypothesis can be accepted (Tinggi et al., 2024).

3. Coefficient of Determination (R^2)

PLS analysis uses the R-squared (R2) values of the endogenous variables to calculate the standard path coefficient of one association between an exogenous variable and an endogenous variable, and the predictive potential of a particular model or construct Masrek et al., (2024). The values of R2 in PLS can be interpreted similarly to the multiple regression analysis results. R2 values indicate the model's ability to explain the variance in the construct, and the R-squared value indicates the exogenous variable's ability to explain the variance in its endogenous counterpart (Tseng et al., 2024)

4. Effect Size (f^2)

An effect size test is conducted to see if exogenous constructs are significant predictors of endogenous constructs. Since the path coefficient does not tell the

effect size of the exogenous latent variables on the endogenous construct, it is important to determine the extent and significance of the path under examination in changing the capacity of the endogenous construct to explain Cohen (2022). It shows which variables have a high impact and which ones are not important. Small effect sizes are 0.02, medium is 0.15, and large is 0.35. In particular, this analysis is very useful in understanding the relative importance of different predictors (Vera, 2025).

5. Predictive Relevance (Q^2)

The model's predictive relevance (Q2) must then be evaluated after determining the effect size (f2). Q^2 measures how well the model predicts data points for dependent variables. The Stone-Geisser non-parametric test is used to evaluate the study model's predictive significance (Chin, 2025). Q2 conduct was calculated utilizing PLS blindfolding processes, where we remove some of the data and predict based on the remaining data. If the Q^2 value is greater than 0, then the model is predictive relevant; otherwise, it is poorly predictive. The quality of the model is revealed by the extracted cross-validated result, which assesses the endogenous constructs' predictability. Hair et al. (2023) stated that Q2 evaluates the model's parameter estimates in addition to its built-in values (Widodo et al., 2023).

3.7.4 Hypothesis

Hypothesis testing aims to check if the proposed relationships in the research framework are supported by empirical evidence. Using Structural Equation Modeling (SEM), each hypothesis will be tested. If the statistically significant levels (p-values) are less than 0.05 and the magnitude of the coefficients is at least equal to the practical significance levels, these hypothesized relationships are statistically and practically significant. Additionally, hypothesis testing will include indirect effects (mediated by customer value). The model was clarified through the results in terms of the direct, indirect, and total effects of variables (Nurcahyani et al., 2024).

E-Service Quality positively influences Customer Satisfaction

E-service quality reflects the overall performance of a bank's online platforms, including attributes such as reliability, responsiveness, usability, and system functionality. According to the SERVQUAL theory Parasuraman et al., (2023), service quality is a multidimensional construct that directly impacts customer perceptions and satisfaction. In mobile banking contexts, customers expect seamless, fast, and secure services. When these expectations are met or exceeded, satisfaction levels increase Rita et al., (2022). This is especially true in conflict-affected areas like Sudan, where system reliability is paramount. Therefore, we hypothesize.

H1: E-Service Quality positively influences Customer Satisfaction

E-Service Quality positively influences Customer Satisfaction, mediated by Customer Value

Beyond direct effects, e-service quality also shapes the perceived value a customer experiences. According to Expectation Confirmation Theory (ECT) Oliver, (2023), perceived value arises when service performance aligns with or surpasses expectations. High-quality e-services provide functional and emotional benefits (e.g., time savings, convenience), enhancing customer value. This value, in turn, fosters satisfaction (Kassim & Abdullah, 2023). Therefore:

H2: E-Service Quality positively influences Customer Satisfaction, mediated by Customer Value

E-Trust positively influences Customer Satisfaction, mediated by Customer Value

E-trust is a key driver of value perception in digital environments, particularly in high-risk contexts like mobile banking in Sudan. From the Theory of Planned Behavior (TPB) perspective, trust can be linked to attitudes and perceived behavioral control Ajzen, (2023), both of which shape user experiences and satisfaction. Trust enhances perceived value by reducing perceived risk and increasing confidence in service use Al-Bashayreh et al., 2022). Thus:

H3: E-Trust positively influences Customer Satisfaction, mediated by Customer Value

E-Trust positively influences Customer Satisfaction

Trust has a direct influence on customer satisfaction in digital banking services, especially during periods of instability. According to ECT, when customers trust that a bank will securely and reliably handle their transactions, their expectations are more likely to be confirmed, leading to satisfaction by Saoula et al., (2023). Prior studies in both developed and emerging economies confirm that trust positively impacts satisfaction (Islam et al., 2023). Thus, we propose:

H4: E-Trust positively influences Customer Satisfaction.

Customer Value positively influences Customer Satisfaction

Customer value represents the trade-off between perceived benefits and costs. According to Expectation Confirmation Theory (ECT) and consumer behavior literature (Zeithaml, 2023), when customers derive high value from a service, in terms of efficiency, relevance, and emotional benefits, they are more likely to report satisfaction. This relationship has been supported in multiple service settings, including e-banking (Masri et al., 2023). Therefore:

H5: Customer Value positively influences Customer Satisfaction.

3.7.5 Mediating Effects

Mediation analysis in this study explores how Customer Value functions as a mediating variable between the independent variables (E-Service Quality and E-Trust) and the dependent variable (Customer Satisfaction) in the context of mobile banking services during crisis recovery in Sudan. The rationale for mediation stems from Expectation Confirmation Theory (ECT), which suggests that satisfaction is not only shaped by direct experiences but also by the perceived value generated through those experiences.

3.8 Variable Indicators

Variable Indicators in this study are as follows:

Table 3. 2 Variable Indicators

No	Variable	Dimensions	Indicators	Symbol	Source

01	**E-Service Quality**	Reliability	The Bank of Khartoum's online services remain reliable even during difficult times or system disruptions.	SQ1	(Iriani et al., 2023)
		Availability	The Bank of Khartoum's online services are consistently accessible whenever needed.	SQ2	(Khatoon et al., 2020)
		Ease of Use	The Bank of Khartoum online banking platform is easy to navigate.	SQ3	(Reddy et al., 2024)
		Responsiveness	The Bank of Khartoum's online banking platform processes transactions quickly.	SQ4	(Alnaim & Sobaih, 2022)
		Functionality	The Bank of Khartoum online services offer essential features that support my banking needs.	SQ5	(S. O. Ighomereho et al., 2022)
		Speed	The speed of transactions on the Bank of Khartoum online platform meets my expectations.	SQ6	(Khatoon et al., 2020)
02	**E-Trust**	Security	I trust the Bank of Khartoum to process my online transactions securely.	ET1	(Liu et al., 2020)
		Data Privacy	The security measures of the Bank of Khartoum's online services protect my data.	ET2	(Alnaim & Sobaih, 2022)
		Customer-Centricity	The Bank of Khartoum acts in its customers' best interest through its online services.	ET3	(Haza Fatikah & Albanna, 2022)
		Reliability	The Bank of Khartoum online services function effectively when needed.	ET4	(Iriani et al., 2023)
		Accuracy	The information provided by the Bank of Khartoum online services is accurate and reliable.	ET5	(Saleem & Saeed, 2024)
		Safety	I feel secure making transactions on the Bank of Khartoum's online banking platform.	ET6	(Melinda et al., 2023)
03	**Customer Value**	Added Value	Using the Bank of Khartoum's online Services improve my banking experience.	CV1	(Hidayat & Otok (2024), 2024)
		Time Savings	The Bank of Khartoum online services save me time in managing financial transactions.	CV2	(Asmar & Tuqan, 2024)
		Goal Achievement	The Bank of Khartoum's online services help me manage my finances effectively.	CV3	(Darmawan, 2024)
		Comparative Worth	The Bank of Khartoum's online banking services provide a valuable alternative to traditional banking.	CV4	(Heriyati et al., 2025)
		Benefit Relevance	The benefits of the Bank of Khartoum online services align with my financial needs.	CV5	(Heriyati et al., 2025)
		Financial Well-Being	The Bank of Khartoum online services contribute positively to my financial well-being.	CV6	(Tseng et al., 2024)
04	**Customer Satisfaction**	Overall Satisfaction	I am satisfied with the overall quality of the Bank of Khartoum's online services.	CS1	(Quality et al., 2023)

	Expectation Fulfilment	The Bank of Khartoum online services meet my expectations.	CS2	(Kumar et al., 2024)
	Service Support	The Bank of Khartoum effectively responds to my inquiries and concerns through its online services.	CS3	(Widodo et al., 2023)
	Recommendation Likelihood	I would recommend the Bank of Khartoum online services to others.	CS4	(Meitria & Harmen, 2024)
	Positive Experience	My experience with the Bank of Khartoum online services has been positive.	CS5	(San et al., 2024)
	Convenience	The convenience and accessibility of the Bank of Khartoum online services enhance my banking.	CS6	(Islam et al., 2023)

Source: Processed by author 2025

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Result Analysis

This study employed a quantitative research approach, utilizing a structured questionnaire, to investigate the factors influencing customer satisfaction with mobile banking: A Case Study of Bank Khartoum in Sudan. The purpose of the tool was to gather consumer behavior about digital marketing initiatives, such as online advertising, email campaigns, mobile banking apps, and social media interaction, and how these affect customer satisfaction levels. Before full-scale distribution, a pilot test was conducted with 30 respondents to assess clarity and reliability. The feedback from this test resulted in several improvements, including rewording unclear items and modifying the format of Likert scale answers. Validity and reliability tests were conducted after the pilot to make sure the instrument measured the pertinent constructs accurately. The target population consisted of active customers who use the digital services of the Bank of Khartoum. To ensure that participants frequently engaged with the bank's website, mobile application, or social media channels, a purposive sampling technique was employed. Google Forms was used to distribute the final survey, which was also shared on Facebook, WhatsApp, and networks of Sudanese university students, bank customers, and online financial forums (Allagabo et al., 2024).

Data collection spanned approximately three weeks and resulted in 300 responses. After filtering for completeness and consistency, 266 valid responses remained for analysis, representing an effective response rate of 88.7%. The sample size was deemed sufficient for statistical analysis using SmartPLS 4.1.1.2. Once data collection was complete, responses were processed using SPSS for descriptive statistics, offering an overview of respondent demographics and digital engagement patterns. The insights drawn from this data were to assist Bank of Khartoum in enhancing its digital strategies and fostering customer loyalty within an evolving digital financial landscape by Kumar et al., (2024). This chapter is structured as follows: the next section presents descriptive statistics, covering the demographic profile of respondents and an analysis of Likert scale items. Following that, the

chapter proceeds to the PLS-SEM model estimation and hypothesis testing (Kumar et al., 2024).

4.1.1 Respondent Characteristics

The study involved distributing questionnaires to users of Bank of Khartoum's digital services. Initially, a total of 300 responses were received. However, after careful screening for completeness and validity, only 266 responses were deemed usable for analysis. This resulted in a valid response rate of approximately 88.7%, which provides a sufficient sample size for statistical modeling using PLS-SEM. The purposive sampling method ensured that participants were active users of the bank's mobile banking application and other digital platforms such as the official website and social media channels (Admasu et al., 2022).

Table 4. 1 Respondent Characteristics by Age

Respondent Profile		Frequency (N)	Percentage (%)
Age	18-24	74	23.8%
	25-34	136	51.1%
	35-44	42	15.8%
	45–54	12	4.5%
	55+	2	0.8%

Source: Processed by author 2025 output SPSS

The analysis begins with the age distribution of respondents. As shown in Table 4.1, the majority of mobile banking users at Bank of Khartoum fall within the 25–34 age group, which accounts for 51.1% (136 respondents) of the total sample. This is followed by the 18–24 age group, comprising 23.8% (74 respondents). Combined, these two age categories represent nearly 75% of the respondents, indicating that digital banking services are predominantly used by young adults. The 35–44 age group constitutes 15.8% (42 respondents), reflecting moderate adoption among mid-career users. Meanwhile, those aged 45–54 represent 4.5% (12 respondents), and respondents aged 55 and above make up just 0.8% (2 respondents), showing limited engagement among older demographics. These findings suggest that the Bank of Khartoum's digital services are especially appealing to younger customers who are typically more digitally literate and comfortable with mobile platforms. Therefore, the bank may benefit from tailoring its mobile banking interface and

marketing strategies to meet the expectations and habits of this dominant demographic segment.

Table 4. 2 Respondent Characteristics by Gender

Respondent Profile		Frequency (N)	Percentage (%)
Gender	Male	186	69%
	Female	80	31%

Source: Processed by author 2025 output SPSS

Turning to gender composition, the respondent pool displays a clear imbalance. Out of 266 valid responses, 186 participants identified as male (69.9%), while 80 identified as female (30.1%). This considerable gap suggests that male users are significantly more active in utilizing Bank of Khartoum's mobile banking services. While the reasons for this disparity fall outside the scope of the current analysis, several possibilities may be worth future exploration. These include differential access to smartphones, variations in digital literacy, or broader socio-cultural dynamics that influence women's engagement with financial technologies in Sudan. Importantly, the underrepresentation of female users highlights an opportunity for the bank to assess potential barriers and design more inclusive digital financial tools. Gender-sensitive campaigns or simplified onboarding processes may encourage wider participation and support efforts toward greater financial inclusion.

Table 4. 3 Respondent Characteristics by Education Level

Respondent Profile		Frequency (N)	Percentage (%)
Education Level	High School	24	9%
	Bachelor's Degree	174	65.4%
	Master's Degree	39	14.7%
	PhD	18	6.8%
	Other	11	4.1%

Source: Processed by author 2025

The educational profile of respondents reflects a highly literate sample. A majority, 65.4% (174 respondents), held a Bachelor's degree, while 14.7% (39 respondents) had completed a Master's program, and 6.8% (18 respondents) possessed a PhD.

Meanwhile, 9.0% (24 respondents) had only a high school education, and 4.1% (11 respondents) reported alternative forms of educational attainment. This distribution suggests that over 86% of the sample holds tertiary qualifications, a factor that likely contributes to higher levels of digital competency and financial engagement. From the lens of the Theory of Planned Behavior (TPB), educational attainment may positively influence both perceived behavioral control and attitudinal readiness, increasing the likelihood of adopting mobile banking technologies. Moreover, individuals with greater educational exposure may form more stable expectations regarding service quality and digital functionality. This aligns with Expectation Confirmation Theory (ECT), which posits that satisfaction emerges when expectations are met or exceeded. Well-educated users may possess more clearly defined expectations and are thus more capable of evaluating whether the Bank of Khartoum's mobile services meet these standards. From a SERVQUAL perspective, these users may also be more sensitive to variations in dimensions such as reliability, responsiveness, and assurance.

Table 4. 4 Respondent Characteristics by Occupation

Respondent Profile		Frequency (N)	Percentage (%)
Occupation	Students	110	41.4%
	Private Employees	56	21.1%
	Lecturers/Researchers	21	7.9%
	Housewives	8	3%
	Government Employee	30	11.3%
	Unemployment	10	3.8%
	Self-Employed	31	11.6%

Source: Processed by author 2025

Regarding occupational background, the largest segment of respondents identified as students, accounting for 41.4% (110 individuals). This was followed by private-sector employees (21.1%), self-employed individuals (11.6%), and government employees (11.3%). Smaller proportions included lecturers or researchers (7.9%), housewives (3.0%), and unemployed individuals (3.8%). The dominance of student respondents suggests that a significant portion of mobile banking users are young, digitally native individuals who are more likely to adopt and rely on online financial

tools. Meanwhile, the notable presence of employed individuals from both the public and private sectors reflects a user base that spans various professional environments. These findings provide useful insights into the types of users engaging with Bank of Khartoum's digital services. While formal hypothesis testing is conducted later in this chapter, understanding the occupational mix adds important context to interpreting behavioral patterns in mobile banking usage.

Table 4. 5 Respondent Characteristics by Occupation

Respondent Profile		Frequency (N)	Percentage (%)
Frequency Of App Usage	Daily	132	49.6%
	Weekly	69	25.9%
	Monthly	30	11.3%
	Rarely	35	13.2%

Source: Processed by author 2025

Next, we examine the usage patterns of Bank of Khartoum's mobile banking application. The data reveal that nearly half of the respondents, 49.6% (132 individuals), reported using the app daily. This high frequency underscores the app's central role in users' financial routines and suggests strong engagement with digital banking services. In addition, 25.9% (69 respondents) indicated weekly usage, reflecting moderate but consistent interaction. A smaller proportion of respondents (11.3%) reported using the app every month, while 13.2% stated they use it only rarely. These figures demonstrate varying levels of adoption and reliance among users, with more than 75% of users accessing the app daily or weekly. The findings point to a well-integrated digital service. However, the presence of occasional and infrequent users highlights the potential for further improvement, particularly in enhancing user experience, trust, or technical accessibility for less engaged segments.

4.1.2 Descriptive Analysis

Table 4. 6 Average (Mean) Score of Questionnaire Items

Code	Statement	Mean
E- Service Quality		
SQ1	The Bank of Khartoum's online services remain reliable even during difficult times or system disruptions.	3.52
SQ2	The Bank of Khartoum's online services are consistently accessible whenever needed.	3.36
SQ4	The Bank of Khartoum's online banking platform processes transactions quickly.	3.48
SQ6	The speed of transactions on the Bank of Khartoum online platform meets my expectations.	3.54
	Mean (E-Service Quality)	**3.48**
E-Trust		
ET1	I trust the Bank of Khartoum to process my online transactions securely	3.85
ET2	The security measures of the Bank of Khartoum's online services protect my data	3.93
ET3	The Bank of Khartoum acts in its customers' best interest through its online services	3.89
ET5	The information provided by the Bank of Khartoum online services is accurate and reliable.	3.89
ET6	I feel secure making transactions on the Bank of Khartoum's online banking platform.	3.94
	Mean (E-Trust)	**3.90**
Customer Value		
CV1	Using the Bank of Khartoum's online services improves my banking experience	4.00
CV2	The Bank of Khartoum online services save me time in managing financial transactions.	4.11
CV3	The Bank of Khartoum's online services help me manage my finances effectively	3.99
CV4	The Bank of Khartoum's online banking services provide a valuable alternative to traditional banking	4.13
CV5	The benefits of the Bank of Khartoum's online services align with my financial needs	3,87
	Mean (Customer Value)	**4.02**
Customer Satisfaction		
CS1	I am satisfied with the overall quality of the Bank of Khartoum's online services	3.45
CS2	The Bank of Khartoum online services meet my expectations.	3.55
CS3	The Bank of Khartoum effectively responds to my inquiries and concerns through its online services.	3.04
CS4	I would recommend the Bank of Khartoum online services to others.	3.88
CS5	My experience with the Bank of Khartoum online services has been positive	3.88

CS6	The convenience and accessibility of the Bank of Khartoum's online services enhance my banking experience.	3,86
	Mean (Customer Satisfaction)	**3.61**

Source: Processed by author 2025

E-Service Quality

The evaluation of E-Service Quality among users of Bank of Khartoum's mobile banking platform reveals a moderately positive perception, especially in terms of system reliability and transaction speed. Based on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), the composite mean score of 3.48 indicates a leaning toward agreement, suggesting that users generally find the digital service acceptable, though not exceptional. Specifically, SQ1 ("the bank's online services remain reliable even during system disruptions") obtained a mean of 3.52, reflecting cautious confidence in the system's resilience, an essential indicator in the post-crisis context.

This score implies that users value the bank's ability to maintain operational continuity, aligning with the Reliability dimension of the SERVQUAL model. SQ4, evaluating responsiveness in processing transactions, scored 3.48, signalling that users perceive the service to be functionally adequate but with room for improvement. This echoes the Responsiveness attribute, which plays a crucial role in digital service environments, particularly in fragile economies where delays can erode trust. The highest score, SQ6 (transaction speed: Mean = 3.54), supports the notion that users are satisfied with efficiency, which strongly contributes to perceived ease of use and enhances customer value, a mediator in the model.

However, SQ2 (service accessibility when needed) received a lower mean of 3.36, indicating occasional user frustration with platform availability. In the context of post-conflict infrastructure instability, this could suggest that perceived service interruptions affect satisfaction more than in stable environments. users rate E-Service Quality positively, the mid-range scores point to a "satisfactory but improvable" digital experience. These findings underscore the importance of reliability and responsiveness in shaping

satisfaction and confirm that in crisis-affected settings like Sudan, even minor service inconsistencies can disproportionately impact user trust and loyalty.

E-Trust

The analysis of the results of E-Trust on mobile banking services at the Bank of Khartoum demonstrates that the user perception is strong and positive, according to the composite mean value of 3.90 on a 5-point Likert scale. This implies that the users typically agree or strongly agree with statements that express trust, which is extremely important in situations that are characterized by the fragility of the institutions and uncertainty after a crisis. The Theory of Planned Behavior (TPB) states the potential to examine the importance of trust in terms of attitudinal beliefs, subjective norms, and perceived behavioral control. The positive attitude toward the ability of the bank translates to the secure processing of transactions, as indicated by the high mean rate of ET1 (3.85), as users would think that the system is trustworthy and adequately technical in meeting their expectations. The top-ranked item (mean = 3.94), ET6, supports the feeling of control by users to have safe transaction environments. As long as people believe that the system is less risky and provides trustworthy results, they tend to act in the patterns of repeated use, therefore, justifying the focus on behavioral intention as a variable of interest by TPB.

The trust towards data privacy, which is addressed by the scale ET2 (Mean = 3.93), demonstrates a high degree of control beliefs towards the protection of personal data. In a digital financial environment, particularly in an economy that is regaining its footing, such as Sudan, this control is vital, eliminating any doubts among the users concerning the utilization of the digital because it would make them feel powerful and assured concerning the utilization of the digital. The perception that the bank is working in the best interest of the customers (ET3, mean = 3.89) is an attitudinal assessment that is based on institutional credibility and perceived integrity. This is supported by ET5 (Mean = 3.89) which indicates that users feel that good and trustworthy information is useful to build trust and influencing the intention of users to behave positively towards

the use (which is accorded to the normative beliefs by TPB that push user behavior) that system reliability measures should have good attitude, the information he receives social sources or institutional sources should be in his favor and that he has sufficient control of the outcome of the operation). This implies that E-Trust is not merely a psychological concept but a behavioral determinant, which has a direct impact on the propensity towards enduring involvement in digital banking in the Sudanese crisis-recovery environment.

Customer Value

The evaluation of Customer Value in the Bank of Khartoum's mobile banking services demonstrates a strongly positive user perception, with an overall mean of 4.02 on a 5-point Likert scale. This indicates that the platform consistently meets or exceeds user expectations, which is central to the Expectation Confirmation Theory (ECT) framework. According to ECT, satisfaction is shaped by the degree to which perceived performance confirms or disconfirms prior expectations. In this study, the high scores across Customer Value indicators suggest a dominant trend of positive confirmation, where users perceive real, tangible benefits from the platform after usage. CV4, the highest-rated item (Mean = 4.13), illustrates that users perceive mobile banking as a valuable alternative to traditional banking, aligning closely with their initial expectations for convenience and digital flexibility.

This positive performance boosts perceived value and contributes directly to satisfaction formation. CV2 (Mean = 4.11) reinforces the platform's time-saving benefit, showing that users recognize and appreciate efficiency as a major functional value. This dimension is often anticipated by users before adopting mobile banking, and when the platform delivers on this promise, it confirms expectations and enhances satisfaction. CV1 (Mean = 4.00) and CV3 (Mean = 3.99) both suggest that the platform is perceived to enhance the overall banking experience and support financial management goals, respectively. These results reflect high performance perceptions that validate users' expectations about convenience, autonomy, and ease of use. CV5, while slightly lower (Mean = 3.87), still indicates favourable views regarding the relevance of

services to personal financial needs. This reflects the role of individualized confirmation, where users evaluate not just generic utility, but personal fit is a key factor in perceived value.

Together, these results affirm that Customer Value is the product of confirmation processes wherein the digital banking experience aligns well with users' prior expectations about functionality, convenience, and control. In post-crisis environments like Sudan, where reliability and accessibility are critical, such value perceptions play a central mediating role between service quality, trust, and overall satisfaction, precisely as theorized by ECT.

Customer Satisfaction

The assessment of Customer Satisfaction with the Bank of Khartoum's mobile banking services yields a moderately high mean of 3.61 on a 5-point Likert scale, indicating that most users hold generally favorable post-usage evaluations of the platform. Within the lens of Expectation Confirmation Theory (ECT), this level of satisfaction reflects a partial confirmation of expectations; some expectations are met or exceeded, while others remain unmet, particularly under the constraints of Sudan's post-conflict recovery. In fragile environments like Sudan, where traditional banking services have been disrupted and digital platforms serve as critical lifelines, user expectations are shaped not only by convenience but also by urgency, reliability, and emotional reassurance. In this context, CS5 and CS4 (both Mean = 3.88) demonstrate strong positive disconfirmation, users find the overall experience satisfying, and are willing to recommend the service, suggesting that the mobile platform has successfully filled essential financial access gaps during the crisis. CS6 (Mean = 3.86) highlights the importance of convenience and accessibility, which are particularly valued in environments where infrastructure damage or physical insecurity limit in-person banking. This confirms that the actual performance of mobile banking when aligned with heightened crisis-driven expectations can significantly enhance user satisfaction, as ECT predicts.

However, not all expectations are met. CS2 (Mean = 3.55) shows that while services meet users' basic needs, the perceived performance does not

significantly exceed expectations, limiting satisfaction to a baseline level. This reflects simple confirmation, which sustains but does not deepen loyalty. The lower score for CS1 (Mean = 3.45) points to moderate satisfaction with overall service quality, suggesting that while users appreciate having digital access, they remain critical of inconsistencies or perceived service gaps, a sentiment often intensified in crisis settings, where service reliability becomes a survival factor rather than a convenience. Most notably, CS3 (Mean = 3.04) signals a serious negative disconfirmation in terms of responsiveness to customer concerns. In a crisis-affected context, where uncertainty elevates user anxiety, slow or ineffective digital support erodes trust and generates frustration. This shortfall in responsive communication undermines the positive effects of other service attributes and emphasizes that emotional and psychological expectations, such as feeling heard or supported, are just as important as technical functionality in shaping satisfaction. while mobile banking at the Bank of Khartoum generally meets the expectations of Sudanese users during the crisis, satisfaction remains fragile and conditional.

The findings suggest that in post-conflict environments, customer satisfaction is not solely a function of performance; it is deeply rooted in the ability of digital services to provide security, reliability, and responsive human connection under pressure. Addressing the disconfirmation caused by low responsiveness is therefore critical to fully realizing the platform's potential in supporting financial resilience and trust in Sudan's recovery phase.

4.1.3 Analysis of the SEM-PLS Model

This study uses a variance-based or component-based approach with the Partial Least Squares (PLS) method. The model obtained using the Partial Least Squares (PLS) method is as follows:

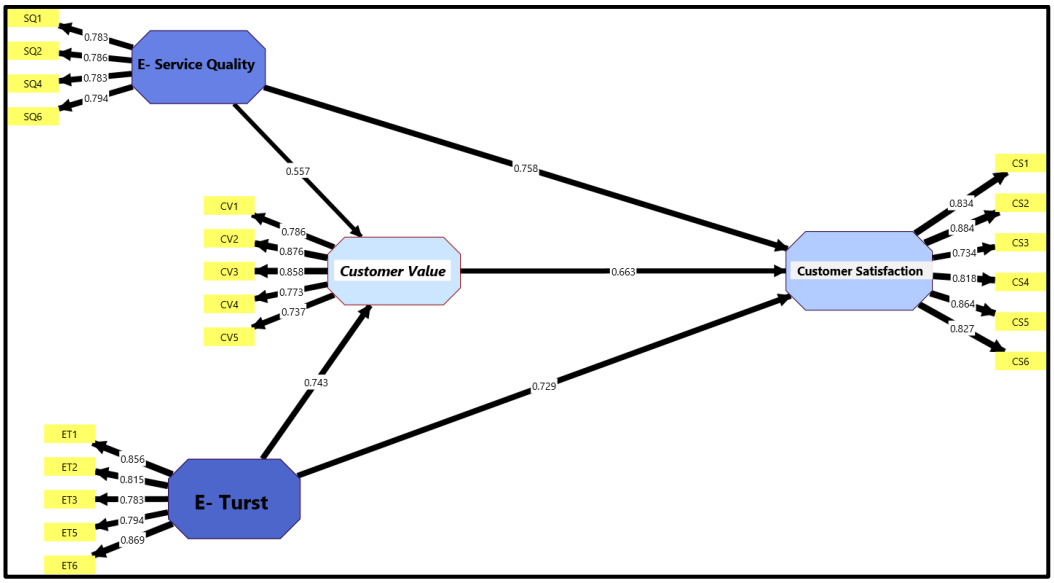

Figure 4. 1 Algorithm Model

processed by author with Smart PLS 4.1.1.2 (2025)

4.1.4 Measurement Model Assessment

Measurement model evaluation was performed by testing convergent validity, discriminant internal consistency reliability and validity

Internal Consistency Reliability

In this study, the internal consistency reliability is assessed through Cronbach's Alpha and Composite Reliability. Cronbach's Alpha is a more conservative assessment of items and is used to estimate the reliability of the multiple-item scale. A construct has internal dependability when its Cronbach's Alpha value is 0.7 or above by Pallant, (2020). Unlike Cronbach's alpha, composite reliability, as described by Hair et al. (2024), Cheung et al. (2024) is more concerned with individual dependability under various outer loadings of the indicator variables. A composite reliability value of 0.7 or greater indicates that the construct is measured consistently with its indicators, which is a good sign of construct reliability (Alamer et al., 2024).

Table 4. 7 Internal Consistency Reliability Test Results

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Description
Customer Satisfaction	0.908	0.914	0.929	**Reliable**
E- Trust	0.881	0.883	0.913	**Reliable**
Customer Value	0.866	0.872	0.903	**Reliable**
E- Service Quality	0.795	0.796	0.866	**Reliable**

processed by author with Smart PLS 4.1.1.2 output (2025)

The result of the internal consistency reliability test in Table 4.7 above shows that all the latent variables are reliable since all of the Cronbach's Alpha and Composite Reliability values are more than 0.7. It shows a high degree of correlation between the indicators of that construct, which reflects the quality criterion of a construct Henchiri et al., (2025) . These values indicate that the measurement items within each construct consistently measure the intended concept. A high alpha suggests strong internal consistency among the items. Although E-Service Quality has the lowest alpha (0.795), it remains above the threshold and is therefore acceptable. Some indicators were removed during the reliability assessment process to enhance internal consistency. Items with low factor loadings or those affecting the overall Cronbach's Alpha were considered for deletion. The final retained items achieved acceptable reliability values, supporting the robustness of the measurement model.

Composite Reliability (CR) provides an alternative and often preferred measure of internal consistency, especially in PLS-SEM. CR considers the actual loadings of each item and is more accurate in reflecting internal consistency than alpha in some cases. According to Bagozzi and Yi (2023), Hair et al. (2025), and Henseler et al. (2025), a CR value above 0.70 indicates good internal consistency. As shown in Table 4.7, all CR values exceed this threshold. These results further support the reliability of the constructs used in this study. Together, the high values of Cronbach's Alpha and Composite Reliability confirm that all constructs demonstrate strong internal consistency and are suitable for further validity analysis.

Convergent Validity

Convergent validity reflects the degree of positive correlation between one measure and another of the same construct. To analyze convergent validity, the Average Variance Extracted (AVE) and factor loadings are evaluated in PLS by Hair et al. (2024) and Janadari et al. (2023). Factor/outer loading measures how strongly each indicator (question) is related to its construct. Strong correlations are confirmed by factor loadings above 0.7. Meanwhile, AVE is the average variance shared by a construct and its measures Janadari et al, 2024). A construct's average variance with its measurements should be higher than that of the other constructs in the same model. On average, the construct explained more than half of the variation of its indicators when the AVE value was equal to or greater than 0.50. An AVE of less than 0.50, on the other hand, suggests that there is still more error in the items than the average variation that the constructs can account for. Accordingly, it is generally accepted that an AVE value of 0.50 or below is appropriate (Hair et al., 2022)

Table 4. 8 Convergent Validity

Variable	*Indicator*	*Factor Loading*	*AVE*	*Description*
E-Service Quality	CQ1	**0.783**	0.618	***Valid***
	CQ2	**0.786**		***Valid***
	CQ3	**0.783**		***Valid***
	CQ4	**0.794**		***Valid***
E-Trust	ET1	**0.856**	0.679	***Valid***
	ET2	**0.815**		***Valid***
	ET3	**0.783**		***Valid***
	ET4	**0.794**		***Valid***
	ET5	**0.869**		***Valid***
Customer Value	CV1	**0.786**	0.652	***Valid***
	CV2	**0.876**		***Valid***
	CV3	**0.858**		***Valid***
	CV4	**0.773**		***Valid***
	CV5	**0.737**		***Valid***

Customer Satisfaction	CS1	**0.834**	0.686	***Valid***
	CS2	**0.884**		***Valid***
	CS3	**0.734**		***Valid***
	CS4	**0.818**		***Valid***
	CS5	**0.864**		***Valid***
	CS6	**0.827**		***Valid***

processed by author with Smart PLS 4.1.1.2 output (2025)

To assess convergent validity, three metrics were examined: factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR). According to Hair et al. (2021), indicator loadings should be ≥ 0.70, AVE ≥ 0.50, and CR ≥ 0.70 to confirm convergent validity. As shown in Table 4.8, all indicator loadings are above the threshold of 0.70. In addition, the AVE values for all constructs exceed the recommended threshold of 0.50. These results confirm that each construct explains more than half of the variance in its observed indicators. Therefore, convergent validity is well established. Based on the table above, it is known that all indicators have a factor loading value > 0.7 and the AVE value of each construct variable is> 0.5. This indicates that all indicators in this study meet convergent validity and can proceed to the next testing.

Discriminant Validity

Discriminant validity testing on reflective indicators is done by comparing the values in the cross-loading table. An indicator is declared valid if it has the highest loading factor value on the targeted construct compared to the cross-loading values on other constructs (Garson, 2025). The results of discriminant validity testing based on cross-loading values are as follows:

Table 4. 9 cross-lodging Score

	Customer Satisfaction	**Customer Value**	**E-Trust**	**E-Service Quality**
CS1	**0.834**	0.499	0.620	0.707
CS2	**0.884**	0.603	0.648	0.714

CS3	**0.734**	0.395	0.484	0.581
CS4	**0.818**	0.543	0.572	0.507
CS5	**0.864**	0.653	0.646	0.629
CS6	**0.827**	0.577	0.633	0.603
CV1	0.521	**0.786**	0.581	0.495
CV2	0.551	**0.876**	0.649	0.455
CV3	0.584	**0.858**	0.672	0.495
CV4	0.522	**0.773**	0.575	0.398
CV5	0.493	**0.737**	0.511	0.400
ET1	0.632	0.636	0.856	0.591
ET2	0.556	0.578	0.815	0.526
ET3	0.630	0.651	0.783	0.622
ET5	0.564	0.568	0.794	0.550
ET6	0.612	0.621	0.869	0.611
SQ1	0.558	0.424	0.588	0.783
SQ2	0.587	0.383	0.498	0.786
SQ4	0.619	0.461	0.554	0.783
SQ6	0.615	0.478	0.580	0.794

processed by author with Smart PLS 4.1.1.2 output (2025)

Based on the cross-loading estimation results presented in Table 4.9 above, it shows that most of the values of the construct correlation with its indicators are greater than the value of the correlation with other constructs. Thus, it can be concluded that most of the constructs or latent variables have good discriminant validity, where the indicators on the respective constructs are better than the indicators on other constructs.

In addition, the Fornell-Larcker Criterion discriminant validity test is used to prove the discriminant validity of two or more factors or constructs. The AVE value of each construct is compared with the shared variance value between constructs. If the AVE of the construct is greater than the shared variance with other constructs, then discriminant validity can be supported. The results of discriminant validity testing based on the Fornell-Larcker Criterion values are presented in the following table:

Table 4. 10 Validity Fornell Lacke

	Customer Satisfaction	*Customer Value*	*E-Service Quality*	*E- Trust*
Customer Satisfaction	***0.828***			
Customer Value	*0.663*	***0.808***		
E- Service Quality	*0.758*	*0.557*	***0.786***	
E- Trust	*0.729*	*0.743*	*0.706*	***0.824***

Source: processed by the author 2025

According to Henseler et al. (2025) and Roemer & Schuberth (2021) Discriminant validity is established when the square root of the AVE for a construct is greater than the correlations between that construct and any other construct in the model. Table 4.10 displays the Fornell-Larcker matrix. The diagonal elements, representing the square root of each construct's AVE, are all higher than the corresponding off-diagonal elements in the same row and column. For example, the square root of the AVE for Customer Satisfaction is 0.828, which is greater than its correlation with Customer Value (0.663), E-Service Quality (0.758), and E-Trust (0.729). Similar patterns hold for all other constructs. This confirms that each construct is empirically distinct, and there is no substantial overlap among the constructs.

Therefore, the Fornell-Larcker criterion supports the discriminant validity of the measurement model.

According to Henseler, Ringle, and Sarstedt (2023), discriminant validity is considered established when HTMT values are below 0.85. In contexts where constructs are expected to be more conceptually similar, a more lenient threshold of 0.90 may be acceptable.

Table 4. 11 Heterotrait-Monotrait Ratio (HTMT) Score

	Customer Satisfaction	Customer Value	E-Service Quality	E- Trust
Customer Satisfaction				
Customer Value	0.743			
E- Service Quality	0.886	0.668		
E- Trust	0.810	0.847	0.840	

Source: processed by author with Smart PLS 4.1.1.2 output (2025)

To further verify discriminant validity, the HTMT ratio was also calculated. Henseler et al. (2025) suggest that HTMT values below 0.90 indicate acceptable discriminant validity, while values below 0.85 are preferred in more conservative assessments. Table 4.11 presents the HTMT values for all construct pairs. All HTMT values are below the 0.90 threshold, with the highest being 0.886 between Customer Satisfaction and E-Service Quality. Specifically, the HTMT value between Customer Satisfaction and Customer Value is 0.743, between Customer Satisfaction and E-Trust is 0.810, and between E-Trust and Customer Value is 0.847. These results indicate that the constructs do not exhibit high levels of similarity, reinforcing their empirical distinctiveness. Thus, both the Fornell-Larcker criterion and the HTMT ratio confirm that discriminant validity has been satisfactorily established in the model. This suggests that the latent variables are not only reliable and valid individually but also sufficiently distinct from one another to justify their separate roles in the structural model.

4.1.5 Structural Model Assessment

After performing the measurement model assessment, the next step is to conduct a structural model assessment to test the research hypotheses. The structural model

assessment examines the Variance Inflation Factor (VIF), Q-Square, and R-Square scores.

Collinearity Test (VIF)

According to Garson (2023) mentions that a variable can be used in a model without high collinearity with a VIF value < 5. If the VIF value > 5, then the variable must be removed from the research model. According to Hair et al. (2025), problems with collinearity arise if two or more variables are associated and produce comparable information. When attempting to measure the collinearity difficulties, the variance inflation factor (VIF) and tolerance are both utilized.

Table 4. 12 Collinearity (VIF) Score of Variables

	Customer Satisfaction	Customer Value	E-Service Quality	E-Trust
Customer Satisfaction				
Customer Value	**2.246**			
E- Service Quality	2.003	**1.994**		
E- Trust	3.091	1.994		

Source: processed by author with Smart PLS 4.1.1.2 output (2025)

According to Hair et al. (2022), and Subhaktiyasa, (2024)The model does not have any collinearity problems if 45 the value of VIF is less than 5, and tolerance values are more than 2. Because the VIF is less than 5 and the tolerance is greater than 2, we can deduce that our model does not have any collinearity problems based on the information presented in Table 4.12 above.

Table 4. 13 Collinearity (VIF) Score of Indicators

	VIF
SQ6	1.580
SQ4	1.538
SQ2	1.633
SQ1	1.628
ET6	2.694
ET5	1.895
ET3	1.797
ET2	2.287
ET1	2.417
CV5	1.631
CV4	1.818

CV3	2.386
CV2	2.766
CV1	2.006
CS6	2.358
CS5	2.813
CS4	2.342
CS3	1.733
CS2	3.094
CS1	2.410

Source: processed by author with Smart PLS 4.1.1.2 output (2025)

4.1.6 Predictive Relevance Test (Q-Square)

The Q-Square test is conducted to determine whether the research model is valid and relevant. Garson (2024) mentions that if the Q-Square value > 0, it means the research model has predictive relevance. The Q-Square values are shown in the following table 4.13 above.

Table 4. 14 Q-Square Score

	Q^2predict	**RMSE**	**MAE**
Customer Satisfaction	0.638	0.607	0.436
Customer Value	0.540	0.686	0.489

Source: processed by author with Smart PLS 4.1.1.2 output (2025)

According to Table 4.14 above, the Q-Square score obtained from these three variables is above 0, indicating that the research model used is valid and has predictive relevance. This means the research model's endogenous variables can be predicted by its exogenous variables.

4.1.7 Determination Coefficient Test (R-Square)

R-squared is a value that shows how much the independent (exogenous) variables influence the dependent (endogenous) variables. R-squared is also known as the coefficient of determination, which explains how well the dependent variable can be explained by the independent variable, according to Ghozali (2025). The value of R-squared ranges from 0 to 1, with the closer it is to 1, the better it is. There are three categories of R-squared values, which are strong, moderate, and weak. R-squared value of 0.75 and above falls into the strong category, values from 0.25 to 0.75 fall into the moderate category, and values below 0.25 fall into the weak category Hair et al (2025). The adjusted R-squared value functions to address a

common issue with R-squared, which is its tendency to increase as more independent variables are added to the model. In contrast, the adjusted R-squared can accurately measure the confidence level in adding independent variables to enhance the model's predictive power. The R-squared score of this research is presented in the following table.

Table 4. 15 R-Square Score

	R-square	R-square adjusted
Customer Satisfaction	0.674	0.670
Customer Value	0.555	0.551

Source: processed by author with Smart PLS 4.1.1.2 output (2025)

The research results show that the R-Square score for the variable Customer Satisfaction is 0.674, with an R-Square Adjusted value of 0.670. This indicates that the model possesses moderate predictive strength in explaining customer satisfaction in the context of mobile banking, where approximately 67.4% of the variation in customer satisfaction can be explained by the model. The remaining 32.6% of the variance is influenced by other variables outside the scope of this study. For the variable Customer Value, the R-Square score is 0.555 and the R-Square Adjusted value is 0.551. This also indicates moderate predictive strength, as 55.5% of the variance in customer value can be explained by the model, while the remaining 44.5% is attributable to external factors not included in the research model. Overall, the R-Square values suggest that the research model demonstrates a moderate level of explanatory and predictive capability in accounting for both customer satisfaction and customer value in the context of mobile banking services provided by Bank Khartoum.

A moderate R-Square score such as this may also indicate that although the independent variables included in the study (e-service quality, e-trust are significant in influencing the dependent variables, there are additional relevant factors outside the current model that influence customer satisfaction and customer value. For instance, external factors such as cultural perceptions, technological infrastructure, brand image, customer digital literacy, or regulatory constraints might contribute to the unexplained variance. In the context of Sudan, limited access to high-speed internet, varying levels of trust in digital financial services, and economic instability

could potentially affect user perceptions of mobile banking, thereby influencing their level of satisfaction and customer value. These findings highlight the importance of incorporating broader contextual variables in future research to improve the model's predictive power. Nonetheless, the current model provides a sufficiently strong foundation for understanding key determinants of mobile banking satisfaction and value, particularly within the Sudanese banking sector.

4.1.8 Hypothesis Testing

Hypothesis testing aims to check if the proposed relationships in the research framework are supported by empirical evidence. Using the path coefficient in PLS-SEM, each hypothesis of this study was tested. Path coefficients are used to determine the strength and direction of relationships between variables (constructs) in the structural model. It shows whether the hypothesized relationships are supported by the data. If the statistically significant levels (p-values) are less than 0.05 and the magnitude of the coefficients is at least equal to the practical significance levels, these hypothesized relationships are statistically and practically significant.

The structural model's explanatory power was assessed using R^2 values for the endogenous variables. The R^2 value for Customer Satisfaction is 0.674, indicating that 67.4% of the variance in Customer Satisfaction is explained by Customer Value, E-Service Quality, and E-Trust. The R^2 value for Customer Value is 0.555, showing that 55.5% of its variance is explained by E-Service Quality and E-Trust. These values reflect a strong explanatory power of the model. The results of the hypothesis testing in this study are shown in the following table:

Table 4. 16 Hypothesis Testing Results

Hypothesis	Coefficient (β)	T-Statistic	P-Value	Result
H1: Customer Value - Customer Satisfaction	0.236	3.658	0.000	Supported
H2: E-Service Quality - Customer Satisfaction	0.469	7.346	0.000	Supported
H3: E-Service Quality - Customer Value	0.063	0.928	**0.353**	**Not Supported**

H4: E-Trust - Customer Satisfaction	0.222	2.709	0.007	Supported
H5: E-Trust - Customer Value	0.699	10.088	0.000	Supported

Source: processed by author with Smart PLS 4.1.1.2 output (2025)

Hypothesis testing in this study uses a two-tailed test with a 5% error rate. Therefore, the critical value to be met is 1.96 for the two-tailed test according to Rodr & Rodr, (2024). The positive or negative effect between exogenous latent constructs and endogenous latent constructs is determined by the path coefficient value. Based on this description, the conclusions on the hypotheses in this study are as follows:

H1: Hypothesis 1 predicted that Customer Value positively influences Customer Satisfaction. This hypothesis is supported ($\beta = 0.236$, $t = 3.658$, $p < 0.001$). The result suggests that when Customer Value a high on their digital banking experiences, they are more likely to be satisfied. This aligns with (Malodia et al., 2022), who found that customer value significantly drives satisfaction in mobile financial services.

H2: Hypothesis 2 predicted a positive effect of E-Service Quality on Customer Satisfaction. The hypothesis is strongly supported ($\beta = 0.469$, $t = 7.346$, $p < 0.001$), indicating that better service quality significantly enhances satisfaction. This is consistent with (Ayinaddis et al., 2023), who confirmed that e-service quality in mobile banking significantly influences user satisfaction across multiple dimensions.

H3: Hypothesis 3 predicted a positive effect of E-Service Quality on Customer Value. However, the result is not supported ($\beta = 0.063$, $t = 0.928$, $p = 0.353$). This suggests that service quality improvements alone do not significantly contribute to customers' perceived value in this sample. This contrasts with (Ho & Tzeng, 2021), who found a moderate impact of digital service quality on perceived value depending on user expectations and engagement levels.

H4: Hypothesis 4 proposed that E-Trust positively influences Customer Satisfaction. The hypothesis is supported ($\beta = 0.222$, $t = 2.709$, $p = 0.007$). This confirms that trust in mobile banking platforms plays a significant role in

determining satisfaction. This aligns with (Risma et al., 2023), who found that trust significantly affects satisfaction among users of Islamic digital banking services, particularly by reducing perceived risk and improving transactional confidence.

H5: Hypothesis 5 predicted that E-Trust has a positive effect on Customer Value. The hypothesis is strongly supported ($\beta = 0.699$, $t = 10.088$, $p < 0.001$). Trust emerges as the most influential factor in enhancing perceived value in digital banking, where security and reliability are essential. This supports the findings of (Prasetio et al., 2025), who emphasized that trust significantly enhances perceived value in service contexts, especially in digitally mediated financial environments.

4.1.9 Mediating Effects

In addition to hypothesis testing, this study also examines indirect effects mediated by TEC-related constructs, particularly Customer Value. The model is designed to capture both direct and indirect pathways linking key variables such as E-Service Quality and E-Trust to Customer Satisfaction within the context of mobile banking in Sudan. These relationships are tested to provide a comprehensive understanding of how user perceptions, trust, and value coalesce to influence satisfaction with digital financial services in a post-conflict environment. The inclusion of Customer Value as a mediating variable enables a deeper investigation into how perceived quality and trust translate into satisfaction through cognitive evaluations.

To test these mediation effects, bootstrapping is applied using SmartPLS, allowing for the estimation of indirect effects and their statistical significance. This process supports the evaluation of whether constructs like E-Trust and E-Service Quality exert their full influence on satisfaction directly or whether their effects are channelled more effectively through Customer Value. By doing so, the study aims to validate the mediating power of value-based perceptions and extend the explanatory capability of TEC within the digital banking sector.

variables and bring together the independent and dependent variables.

Table 4. 17 Specific Indirect Effect Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
E- Service Quality -> Customer Value -> Customer Satisfaction	0.015	0.015	0.017	0.895	0.371
E- Turst -> Customer Value -> Customer Satisfaction	0.165	0.166	0.052	3.168	0.002

*Significant at a 1% significance level (α = 0.01)

**Significant at a 5% significance level (α = 0.05)

***Significant at a 10% significance level (α = 0.10)

Source: processed by author with Smart PLS 4.1.1.2 output (2025)

Specific indirect effects help identify which mediating pathways are most influential in shaping Customer Satisfaction in the context of mobile banking services. As shown in Table 4.17 above, the indirect effect results reveal varying levels of significance between the two main pathways tested in this study.

Based on the results, the indirect path from E-Trust to Customer Satisfaction mediated by Customer Value is positive and statistically significant at the 1% level (β = 0.165, t = 3.168, p = 0.002). This suggests that trust in the mobile banking system, particularly during crisis recovery, contributes meaningfully to perceived value, which in turn leads to greater customer satisfaction. This confirms the mediating role of Customer Value, indicating that trust not only directly enhances satisfaction but also exerts additional influence through the perceived benefits and worth of the service. This result is consistent with previous studies emphasizing the importance of trust as a psychological enabler in technology adoption and satisfaction in uncertain environments.

In contrast, the indirect path from E-Service Quality to Customer Satisfaction via Customer Value is not significant, with a p-value of 0.371 and a t-statistic below the critical threshold (β = 0.015, t = 0.895). Despite a positive coefficient, the lack of statistical significance implies that improvements in e-service quality do not necessarily enhance satisfaction through perceived value. This may reflect user sensitivity to trust and security rather than performance

features during post-conflict recovery phases, where emotional assurance may matter more than technical functionality.

Overall, the findings suggest that Customer Value plays a partial mediating role in the relationship between E-Trust and Customer Satisfaction, but not between E-Service Quality and Customer Satisfaction. These distinctions are critical for understanding how users in post-crisis economies perceive and evaluate digital services. Strengthening trust mechanisms, such as data security, transparency, and communication, may enhance value perception and thereby boost satisfaction more effectively than service enhancements alone.

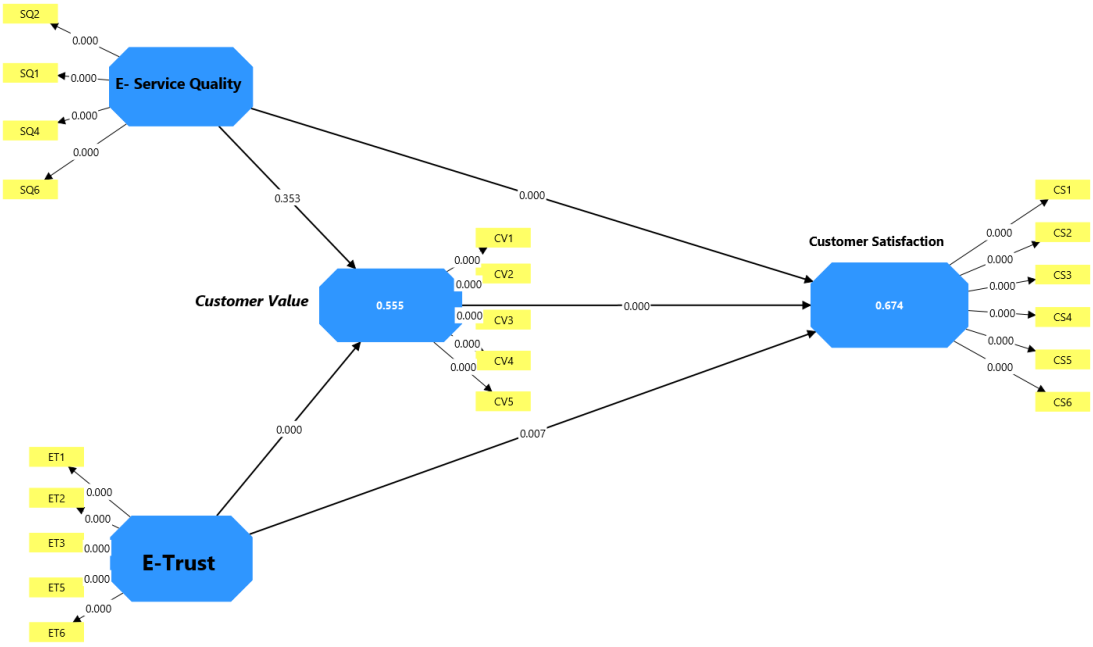

Figure 4. 2 Bootstrapping Model

processed by author with Smart PLS 4.1.1.2 (2025)

4.2 Discussion

In this section, the results of the analysis using SmartPLS 4.1.1.2 software are explained. This research aims to analyze how the TPB, SERQUAL, ECT, and Determinants of Customer Satisfaction Toward Mobile Banking: A Case Study of Bank Khartoum in Sudan, based on the hypotheses. Following this, the author formulates policy recommendations for stakeholders. The findings reveal several key points (Hamadou et al., 2024).

H1: E-service Quality positively influences Customers' Satisfaction

The analysis reveals that e-service quality has a significant positive effect on customer satisfaction in the context of Bank of Khartoum's mobile banking services. These findings align with prior research across diverse national contexts. For instance, Beanning, (2024) found that e-service quality significantly influences customer satisfaction and loyalty in Indonesian mobile banking. Similarly, (Bukhari et al., 2024) emphasized ease of use, efficiency, and responsiveness as key contributors to satisfaction in Malaysia. Similarly, studies in African contexts report parallel patterns. Ayinaddis et al., (2023) demonstrated that responsiveness, reliability, security, and convenience all significantly affect satisfaction and loyalty in Ethiopia's e-banking sector. Likewise, Ighomereho et al. (2024) observed in Nigeria that reliability and system efficiency are central to satisfaction in internet banking services. However, this study contributes a critical contextual nuance by grounding the findings in Sudan's post-crisis environment, where access to traditional banking services has been severely disrupted by the ongoing conflict.

In such fragile settings, digital banking platforms like Bankak are not merely optional conveniences; they represent essential financial lifelines. For Bank of Khartoum, maintaining a consistently reliable, secure, and user-friendly platform during this period of instability becomes not only a matter of competitiveness, but of institutional resilience and public trust-building. The findings suggest that, in contrast to more digitally mature markets where baseline service reliability is often taken for granted, technical quality remains a direct and salient driver of customer satisfaction in Sudan, where users face fluctuating connectivity, limited digital literacy, and institutional uncertainty. This explains why e-service quality

dimensions such as responsiveness, ease of use, and system uptime exert a stronger and more immediate influence on satisfaction.

The results of this research also follow the results of research conducted by Asadpoor & Abolfazli, (2022); Raza et al., (2020); Aly & Ahmed, (2023); San et al., (2024), where the results of these studies also found that E-Service Quality has a significant contribution in increasing customer satisfaction. However, not all studies report a uniformly strong relationship between e-service quality and customer satisfaction. In South Africa, a Contradictory Study conducted by Mujinga, (2020) found mixed results; some dimensions of e-service quality were significant predictors of satisfaction; however, others, like ease of use and communication, did not exert a statistically significant effect. Likewise, Khatoon et al., (2020) in Qatar observed that although reliability, responsiveness, and security significantly influenced customer purchase intentions, certain service quality dimensions were only indirectly linked to satisfaction through mediators like trust and perceived usefulness. These inconsistencies likely stem from contextual factors such as varied digital maturity, user expectations, and infrastructural readiness.

In more digitally developed environments, users may assume a baseline level of service quality, thereby focusing more on trust or perceived usefulness. Conversely, in the Sudanese context, where connectivity challenges and technological familiarity vary, our findings demonstrate a clear and direct link between e-service quality and customer satisfaction. This suggests that technical service aspects remain directly influential and central to satisfaction in environments with less stable digital infrastructure.

H2: E-service Quality positively influences Customer Satisfaction, mediated by Customer Value.

this research findings indicate that E-Service Quality has a significant direct effect on Customer Satisfaction, and this partial mediation finding aligns with studies in other contexts. For Instance, Ayinaddis et al. (2023) in Ethiopia found that e-banking quality dimensions like responsiveness and reliability indirectly influence satisfaction through customer service value. Similarly, a study conducted by Bashir et al. (2023) in Bangladesh confirmed that customer value partially mediates the

effect of e-banking service quality on satisfaction. In Indonesia, Tedjakusuma (2025) observed a comparable pattern where value perception influenced satisfaction but did not fully account for the effect of service quality. The implication for the Bank of Khartoum is that while maintaining high standards of digital service quality is essential for customer satisfaction, it is equally important to enhance how value is perceived by users. This includes emphasizing benefits that align with user expectations, such as efficiency, usefulness, and cost-effectiveness, which in turn can deepen their satisfaction and engagement with the platform. In a post-conflict environment like Sudan, this perceived value becomes especially salient: digital banking services are not merely tools of convenience but rather critical mechanisms for financial survival and continuity. As customers navigate disrupted economic systems and limited physical banking access, their assessment of "value" increasingly reflects how digital services enable resilience by saving time, ensuring safety, and offering control in unstable conditions. Therefore, value perception in this context is likely heightened and emotionally charged, which reinforces the partial mediation observed in this study. However, the indirect effect of E-Service Quality on Customer Satisfaction via Customer Value is not universally supported. In a Turkish contradictory study undertaken by ÇetİnsÖz, (2022) investigated the influence of e-service quality on perceived value among domestic tourists was investigated and found no significant direct link between certain service quality dimensions and customer value. Similarly, an Indonesian study by Iriani et al. (2023) in the online transportation sector (Gojek) reported that while reliability, empathy, and assurance positively impacted satisfaction, these dimensions did not significantly influence loyalty via customer value, indicating that satisfaction did not always mediate the relationship as expected.

These divergent findings suggest that the mediating role of Customer Value may depend heavily on sectoral and contextual factors, such as user expectations, service maturity, or cultural perceptions of value. In tourism or ride-hailing contexts characterized by high convenience and user familiarity, the effect of technical service quality may be absorbed through other constructs like trust or perceived usefulness. By contrast, our findings in the Sudanese mobile banking context, shaped by war-induced disruption, heightened user vulnerability, and institutional

instability, demonstrate both a significant direct path from E-Service Quality to Customer Satisfaction and a partial mediation via Customer Value. This implies that in environments with less mature digital ecosystems and ongoing crises, technical service dimensions remain visibly salient to users, while value perception serves as an emotional and functional filter that reinforces satisfaction. Both constructs thus play distinct and complementary roles in shaping post-crisis service outcomes.

H3: E-Trust positively influences Customer Satisfaction

The analysis reveals that E-Trust has a significant positive effect on Customer Satisfaction. These findings are consistent with prior research. For example study conducted by Al-hawari (2022) found that trust significantly predicts satisfaction and loyalty in e-banking within the UAE. Similarly, Khan et al. (2023) demonstrated that e-trust is a key determinant of satisfaction among online financial service users in Pakistan. These studies highlight the universal importance of trust in digital service quality evaluations. For Bank of Khartoum, this result underscores the need to continually invest in robust security measures, data protection policies, and transparent digital communication. Importantly, in Sudan's post-conflict environment, the role of trust takes on an even more critical and foundational dimension. In fragile states where public infrastructure, institutional reliability, and economic stability have been severely weakened, digital trust becomes more than a service attribute; it functions as a substitute for lost institutional confidence. Customers in such contexts are not simply evaluating whether an app functions well; they are asking whether the institution behind it can be trusted to safeguard their limited financial resources in the face of national uncertainty.

Thus, the presence of a significant direct relationship between e-trust and satisfaction in this study underscores how, in Sudan, trust is not only a mediator or facilitator of perception but a survival mechanism that strongly influences user attitudes toward service reliability and future use. While this study found that E-Trust has a significant direct influence on Customer Satisfaction, this relationship is not consistently supported across all contexts. For instance, a contradictory study by Toqeer et al. (2021) in a study on mobile banking users in Pakistan, researchers reported that trust significantly influenced perceived usefulness and loyalty, but did not directly predict customer satisfaction. Their findings suggest that trust may

function more effectively as an antecedent to cognitive or affective evaluations, such as perceived usefulness or emotional assurance, rather than as a direct determinant of satisfaction. The authors highlight that in developing economies with fragile institutional environments, users may anchor their satisfaction more firmly in tangible service outcomes like speed, efficiency, and system functionality than in generalized perceptions of trust. An Indian contradictory study conducted by Kumar et al. (2023) further supported this view, indicating that e-trust and perceived risk influenced digital banking usage primarily through satisfaction rather than directly determining it. In Malaysia, a contradictory study by Masrek et al. (2022) revealed that although trust played an important role in adoption decisions, users in more digitally mature environments were inclined to base satisfaction judgments on system performance, responsiveness, and functional features rather than trust alone. By contrast, the current findings from Sudan demonstrate a significant and direct path from E-Trust to Customer Satisfaction. This divergence may be attributed to Sudan's relatively nascent stage of mobile banking adoption and the broader national crisis that has disrupted conventional banking access.

In these scenarios where the customers are in a constant fear of losing their data, having improper services, and reliability of the monetary system, the trust is not an added value anymore, since it turns into one of the keys evaluating prisms through which users will pass their judgement regarding safety and transparency, as well as intentions of the institution. This case is further aggravated by low digital literacy levels, financial dependence, and psychological effects of conflict, which all increase customer sensitivity on institutional trustworthiness. Therefore, on the one hand, trust suffices as a non-derivative expectation in emerging and crisis-struck markets such as the one in Sudan, whilst, on the other hand, such a concept differentiates the user satisfaction in such markets in a manner that cannot be reproduced in more stable environments. These discrepancies are indicative of the need to interpret the phenomenon of trust as an expression of the surrounding socio-digital setting. They further demonstrate the importance of shaping financial services delivered digitally and configuring it to meet the digital maturity levels, stable comprehensive infrastructure, and levels of trustworthiness at the local levels, especially in fragile and transitional economies.

H4: E-Trust positively influences Customer Satisfaction, mediated by Customer Value

The findings of this study reveal that E-Trust exerts a significant influence on Customer Satisfaction, with Customer Value acting as a partial mediator. This mediated relationship is consistent with several recent studies, although variations exist across contexts. For example, Militina & Achmad (2020) in their study of Indonesian mobile banking users, they found that e-trust significantly enhanced e-satisfaction, which subsequently strengthened customer loyalty. While Customer Value was not explicitly modeled, their findings implied that trust heightened users' perceptions of service benefit a central component of perceived value, thereby indirectly boosting satisfaction. Similarly, Catur et al. (2023)observed that trust did not exert a direct influence on customer satisfaction in mobile banking; instead, its effect was mediated by perceived convenience, a construct closely aligned with customer value. These results suggest that trust operates not as an isolated driver of satisfaction but rather as a foundational condition that shapes customers' perceptions of value and usability. In this mediated pathway, trust fosters confidence in the platform's reliability and security, which in turn enhances the user's perception of the service, ultimately leading to satisfaction.

Moreover, Saleem & Saeed (2024) found that trust significantly enhances customer value, which in turn improves user engagement and satisfaction outcomes in e-commerce platforms. Such evidence reinforces the conceptual logic of the trust–value–satisfaction pathway, particularly in contexts where customers rely heavily on digital platforms for essential services. In the case of Sudan's post-crisis financial landscape, the role of trust becomes even more critical. The erosion of institutional stability, widespread physical insecurity, and intermittent access to conventional banking have all elevated the importance of mobile banking platforms like Bankak. In this context, E-Trust is not merely a psychological construct but a survival-oriented requirement, through which users evaluate the platform's security, responsiveness, and reliability. As such, the development of trust directly shapes perceived value by enhancing users' sense of safety, control, and service effectiveness during uncertainty.

For the Bank of Khartoum, these findings carry significant strategic implications. E-Trust must not be viewed in isolation; rather, it functions as the bedrock upon which customer value perceptions are formed. Investments in cybersecurity, transparent communication, user empowerment, and crisis-resilient digital infrastructure are thus essential not only to instill immediate confidence but also to construct a lasting sense of value that drives satisfaction and loyalty in a volatile environment. By strengthening the trust–value–satisfaction chain, the bank can better respond to the heightened emotional and functional needs of users in a conflict-affected society. Another study conducted by Taqi (2021) A study of mobile banking users in Morocco confirmed that E-Trust significantly influences customer Value, and that this value partially mediates the relationship with Customer Satisfaction. Their findings, grounded in Expectation Confirmation Theory (ECT), highlight that perceived security and data transparency increase users' sense of benefit and utility, which enhances satisfaction even in the absence of direct service interaction. However, not all studies report a direct and significant influence of E-Trust on Customer Satisfaction, even when Customer Value is considered as a mediator.

For instance, a recent study conducted by Catur et al. (2023) on mobile banking users of Livin' by Mandiri in Indonesia found that while trust positively influenced the perceived convenience construct closely aligned with Customer Value, it did not have a statistically significant direct effect on customer satisfaction. Instead, the influence of trust was fully mediated by convenience factors, suggesting that users assessed satisfaction based on how trust enhanced their experience of value-related dimensions such as ease, efficiency, and usability, rather than trust acting as a standalone driver. This divergence highlights a critical contextual nuance: in mature digital banking environments such as Indonesia's, where users may already expect a baseline of security and reliability, trust tends to function more as an enabling condition rather than a distinguishing factor. Users might place more weight on the perceived utility derived from trust, such as seamlessness and speed, than on trust itself when evaluating satisfaction. By contrast, in our study of the Sudanese mobile banking context, where digital ecosystems are still developing and institutional trust is fragile, E-Trust emerged as

both a direct and indirect driver of satisfaction. In contrast, our findings in Sudan's fragile digital banking environment reveal a more pronounced role for E-Trust, both as a direct and mediated contributor to satisfaction. In low-trust societies recovering from conflict, where users face high uncertainty and limited alternatives, trust must be tangible, visible, and consistently reinforced to yield satisfaction. Thus, E-Trust in this context plays a dual role: enabling perceptions of service value and directly fostering satisfaction by mitigating fear, scepticism, and perceived institutional risk.

H5: Customers' Value positively influences Customer Satisfaction.

The analysis shows that Customer Value has a significant positive effect on Customer Satisfaction. Empirical studies support this relationship. For instance, a study by Widodo et al. (2023)found that customer value significantly influences customer satisfaction in the context of café restaurants in Malang, Indonesia. The study utilized Structural Equation Modeling and reported that customer value positively affects customer satisfaction, which in turn enhances brand image. This underscores the importance of delivering value that meets or exceeds customer expectations to foster satisfaction. Similarly, research by Hapsari et al. (2023) in the airline industry demonstrated that customer value plays a partial mediating role between service quality and customer satisfaction. The study concluded that higher customer value leads to increased customer satisfaction, highlighting the critical role of value perception in service industries. These findings collectively emphasize that enhancing customer value through superior service quality, emotional engagement, and fair pricing can lead to higher customer satisfaction. For service providers, this implies that strategies aimed at increasing customer value are likely to yield significant improvements in customer satisfaction levels.

However, some recent evidence challenges the notion that Customer Value always translates into Customer Satisfaction in banking contexts. A study by Hidayat & Otok (2024) focusing on savings customers in Indonesia's Islamic banks found that although perceived value was modelled and measured, it did not have a statistically significant effect on customer satisfaction, with an effect size close to zero (10.2%) and p-values above the typical 0.05 threshold. The authors conclude that while value perceptions existed, they did not reliably drive satisfaction,

possibly because customers did not yet experience consistent emotional or functional benefits from digital or shariah-compliant offerings. These findings suggest that in certain high-involvement financial contexts, particularly where service features or institutional trust play more dominant roles, perceived value alone may be insufficient to generate satisfaction. Instead, customers may require repeatable experience, trust, or emotional reassurance before "value" translates into a satisfied mindset. In contrast, our findings in the Sudanese mobile banking context show a strong and significant direct effect of Customer Value on Customer Satisfaction, reaffirming the hypothesis. This divergence can be attributed to the post-crisis nature of the Sudanese financial landscape, where customers are operating in a fragile institutional setting characterized by political instability, constrained mobility, and limited access to traditional banking channels. In such environments, the perception of value is immediate and tangible, rooted in how digital banking platforms offer basic financial access, safety, time-saving functionality, and control over personal resources during uncertain times. In this sense, Customer Value becomes more than just a subjective evaluation of benefits versus costs; it transforms into a core mechanism for rebuilding institutional trust, enabling economic participation, and offering emotional reassurance in a crisis-stricken society. The urgency and scarcity of alternatives make mobile banking services more valuable, not merely because of their technical features, but because they offer stability and predictability in a disrupted system.

Thus, although evidence against conventional wisdom by predecessors' points to a possible inadequacy of value as the sole determinant of satisfaction in the digital-mature or trust-filled communities, the present report provides a critical note that in emergent economies with histories of conflicts, such as that of Sudan, customer value scores prominently in the satisfaction-building process. To providers like the Bank of Khartoum, the study at hand supports the promotion of cognitive value via useful advantages, empowerment of the users, and emotional reassurances that have become extremely valuable in their influence under the circumstances of crisis. The implications of such strategies to how investments in customer value creation are contextualized to local circumstances are evident since

situations like volatility, digital inequity, and institutional frailty characterizing an environment should be put into consideration.

CHAPTER V

CONCLUSION AND FUTURE RESEARCH

5.1 Summary And Conclusion

This study investigated the determinants of customer satisfaction with mobile banking services at the Bank of Khartoum, Sudan, during a period marked by post-conflict recovery and systemic instability following the April 2023 crisis. Grounded in the Theory of Planned Behaviour (TPB), Expectation-Confirmation Theory (ECT), and the SERVQUAL model, the research assessed the roles of E-Service Quality, E-Trust, and Customer Value in shaping customer satisfaction under crisis conditions. Data from 266 respondents across major Sudanese cities were analyzed using SmartPLS 4.1.1.2. Of the five proposed hypotheses, four were supported: E-Service Quality, E-Trust, and Customer Value had significant positive effects on Customer Satisfaction, and E-Trust also significantly influenced Customer Value. However, the hypothesized link between E-Service Quality and Customer Value was not statistically supported. The structural model exhibited robust explanatory power, with the key constructs accounting for 67.4% of the variance in Customer Satisfaction and 55.5% in Customer Value. These findings underscore the heightened relevance of digital trust and perceived value in crisis-affected contexts, where traditional service metrics may be deprioritized in Favor of emotional security and continuity of access. The lack of a direct effect from service quality to value may reflect users' greater concern with trust and safety over technical performance amid institutional breakdown. Ultimately, the results affirm that in fragile digital ecosystems, trust is not only a central outcome but also a vital mechanism for sustaining customer satisfaction, emphasizing the urgent need for banks to invest in resilient, secure, and crisis-responsive digital infrastructure.

Theoretical Implications

This study contributes to theoretical discourse on digital banking by integrating TPB, SERVQUAL, and ECT within a developing economy context. The empirical results affirm foundational tenets of ECT and TPB, particularly in highlighting the role of trust and perceived value in fostering customer satisfaction. Additionally,

the findings offer a refined perspective on SERVQUAL by demonstrating that while service quality exerts a direct influence on satisfaction, its contribution to Customer Value may not be significant in every context. This insight enhances our understanding of how service expectations and evaluations may differ in emerging digital economies.

5.2 Policy Recommendations

This study provides policy recommendations grounded in empirical findings and contextualized within Sudan's post-crisis financial environment. The April 2023 conflict severely disrupted traditional banking infrastructure: physical branches were destroyed, large-scale looting occurred, and users were exposed to rampant digital fraud. In this context, mobile banking services, particularly those provided by the Bank of Khartoum, became vital lifelines for financial access. The following recommendations are intended to rebuild digital trust, enhance system resilience, and promote inclusive digital finance recovery:

1. National Digital Financial Literacy Initiative: The Sudanese government, in collaboration with the Central Bank of Sudan, academic institutions, and civil society, should launch a nationwide digital financial literacy program. This must go beyond general awareness to include structured education on secure digital behavior, fraud prevention, and trust-building in mobile banking. Special attention should be given to displaced populations and war-affected regions, where misinformation and fear have eroded user confidence.
2. Post-Crisis Legal Reform for Digital Protection: In response to the rise in fraud and data breaches during the war, Sudan must establish emergency digital banking legislation. The Central Bank and the Ministry of Justice should co-develop robust legal frameworks covering data privacy, fraud prosecution, and consumer protection tailored to mobile banking. These laws should prioritize enforcement in vulnerable areas and provide accessible legal recourse for victims of digital crimes.
3. Resilient and Inclusive Digital Infrastructure: The war exposed the fragility of telecom and banking infrastructure, especially in rural and conflict zones. The government must invest in resilient ICT infrastructure, using public-

private partnerships to expand mobile network coverage and increase internet reliability. Emergency-ready mobile systems with offline capabilities should be prioritized for deployment in high-risk areas.

4. Trust-Centered Customer Experience by Banks: The Bank of Khartoum and other financial institutions should adopt trust-centered design in mobile banking platforms. This includes multi-factor authentication, real-time alerts, transaction verification tools, and emergency support lines. Furthermore, platforms must enhance transparency in communication and provide clear user redress procedures for fraud or service failure cases.
5. Support for Crisis-Aware FinTech Startups: FinTech innovation must be encouraged to fill service gaps exposed during the conflict. The government should offer grants, tax incentives, and fast-track licensing to startups that offer secure, localized, and accessible mobile financial solutions. These startups can target underserved users, especially women, youth, and IDPs, with tailored products that rebuild trust and usability.
6. A National Digital Finance Resilience Strategy: A long-term Digital Financial Resilience Roadmap should be formulated by the Ministry of Finance, Central Bank, and key stakeholders. This strategy must define crisis-response metrics, institutional protocols, and recovery benchmarks. It should also establish a digital finance early warning system, enabling faster responses to future disruptions.

5.3 Limitations of this Study and Future Research

This study offers meaningful insights but is subject to several limitations. Conducted in the specific context of post-conflict Sudan and focused on Bank of Khartoum users in selected regions, the findings may not be generalizable to less affected areas or more digitally mature economies. The use of a quantitative, cross-sectional design limits the ability to observe changes over time, while reliance on purposive sampling and local facilitators introduces potential selection bias. Future research should consider broader institutional comparisons, longitudinal or qualitative methods, and additional variables such as socio-cultural and infrastructural resilience to better capture dynamics in fragile environments.

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APPENDIX:

1. Ethical Clearance Document:

Universitas
Islam Internasional
Indonesia

Kementerian Agama Republik Indonesia
Universitas Islam Internasional Indonesia
Jalan Raya Bogor KM. 33.5
Cisalak, Sukmajaya, Depok, Jawa Barat 16416
ethical.clearance@uii.ac.id
www.uii.ac.id

RESEARCH ETHICAL CLEARANCE APPROVAL

No: 05/REC/UIII.02/06/2025

Herewith the Universitas Islam Internasional Indonesia (UIII) Research Ethics Committee informs that,

Research Title	: Determinants of Customer Satisfaction Toward Mobile Banking: A Case Study of Bank Khartoum in Sudan
Application Number	: 250420250002
Institution	: Universitas Islam Internasional Indonesia
Faculty	: Faculty of Economics and Business
Research Coordinator	: Fajar B. Hirawan, Ph.D.

Has been evaluated in the review meeting on May 16th, 2025.

Based on the results of the review, the UIII Research Ethics Committee has made the decision: **The research with the application number has met the ethical clearance requirements with a period of research from June to August 2025**.

Researchers remain obligated to:

a. Submit a new application shall there be amendment to research design or research subject;
b. Submit a report when the field research has been completed; and
c. Provide information if there is a change in location, research time and/or termination ahead of schedule.

The UIII Research Ethics Committee has the right to conduct monitoring during the research.

Depok, June 5th, 2025
Chief of UIII Research
Ethics Committee

Drs. M. Rifqi Muna, MDefStu, Ph.D.

2. SMART-PLS Output

Outer Loadings

	Customer Satisfaction	Customer Value	E- Service Quality	E- Turst
CS1	**0.834**			
CS2	**0.884**			
CS3	**0.734**			
CS4	**0.818**			
CS5	**0.864**			
CS6	**0.827**			
CV1		**0.786**		
CV2		**0.876**		
CV3		**0.858**		
CV4		**0.773**		
CV5		**0.737**		
ET1				**0.856**
ET2				**0.815**
ET3				**0.783**
ET5				**0.794**
ET6				**0.869**
SQ1			**0.783**	
SQ2			**0.786**	
SQ4			**0.783**	
SQ6			**0.794**	

Fornell-Larcker Criterion

	Customer Satisfaction	Customer Value	E- Service Quality	E- Turst
Customer Satisfaction	**0.828**			

Customer Value	**0.663**	**0.808**		
E- Service Quality	**0.758**	**0.557**	**0.786**	
E- Turst	**0.729**	**0.743**	**0.706**	**0.824**

Cross Loadings

	Customer Satisfaction	**Customer Value**	**E- Service Quality**	**E- Turst**
CS1	0.834	0.499	0.707	0.620
CS2	0.884	0.603	0.714	0.648
CS3	0.734	0.395	0.581	0.484
CS4	0.818	0.543	0.507	0.572
CS5	0.864	0.653	0.629	0.646
CS6	0.827	0.577	0.603	0.633
CV1	0.521	0.786	0.495	0.581
CV2	0.551	0.876	0.455	0.649
CV3	0.584	0.858	0.495	0.672
CV4	0.522	0.773	0.398	0.575
CV5	0.493	0.737	0.400	0.511
ET1	0.632	0.636	0.591	0.856
ET2	0.556	0.578	0.526	0.815
ET3	0.630	0.651	0.622	0.783
ET5	0.564	0.568	0.550	0.794
ET6	0.612	0.621	0.611	0.869
SQ1	0.558	0.424	0.783	0.588
SQ2	0.587	0.383	0.786	0.498
SQ4	0.619	0.461	0.783	0.554
SQ6	0.615	0.478	0.794	0.580

Heterotrait-Monotrait Ratio (HTMT)

	Customer Satisfaction	**Customer Value**	**E- Service Quality**	**E- Turst**

Customer Satisfaction				
Customer Value	**0.743**			
E- Service Quality	**0.886**	**0.668**		
E- Turst	**0.810**	**0.847**	**0.840**	

Inner VIF Values

	Customer Satisfaction	**Customer Value**	**E- Service Quality**	**E- Turst**
Customer Satisfaction				
Customer Value	2.246			
E- Service Quality	2.003	1.994		
E- Turst	3.091	1.994		

Collinearity (VIF) Score of Indicators

	VIF
CS1	2.410
CS2	3.094
CS3	1.733
CS4	2.342
CS5	2.813
CS6	2.358
CV1	2.006
CV2	2.766
CV3	2.386
CV4	1.818
CV5	1.631
ET1	2.417

ET2	2.287
ET3	1.797
ET5	1.895
ET6	2.694
SQ1	1.628
SQ2	1.633
SQ4	1.538
SQ6	1.580

Construct Crossvalidated Redundancy

	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**
Customer Satisfaction	0.908	0.914	0.929	0.686
Customer Value	0.866	0.872	0.903	0.652
E- Service Quality	0.795	0.796	0.866	0.618
E- Turst	0.881	0.883	0.913	0.679

R Square

	R-square	**R-square adjusted**
Customer Satisfaction	**0.674**	**0.670**
Customer Value	**0.555**	**0.551**

Path Coefficients

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**

Customer Value -> Customer Satisfaction	**0.236**	**0.236**	**0.065**	**3.658**	**0.000**
E- Service Quality -> Customer Satisfaction	**0.469**	**0.472**	**0.064**	**7.346**	**0.000**
E- Service Quality -> Customer Value	**0.063**	**0.063**	**0.068**	**0.928**	**0.353**
E- Turst -> Customer Satisfaction	**0.222**	**0.219**	**0.082**	**2.709**	**0.007**
E- Turst -> Customer Value	**0.699**	**0.700**	**0.069**	**10.088**	**0.000**

Specific Indirect Effects

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**
E- Service Quality -> Customer Value -> Customer Satisfaction	**0.015**	**0.015**	**0.017**	**0.895**	**0.371**
E- Turst -> Customer Value -> Customer Satisfaction	**0.165**	**0.166**	**0.052**	**3.168**	**0.002**

3. Questionnaire Form:

Research Instrument

Determinants of Customer Satisfaction Toward Mobile Banking: A Case Study of Bank Khartoum in Sudan

Assalamu'alaykum Wr. Wb.

Thank you for participating in this research.

My name is Husny Gibreel, a Master's student at the Faculty of Economics and Business at the International Islamic University of Indonesia.

This questionnaire was designed to collect data from Bank of Khartoum customers to assess their views on the quality of electronic services, e-trust, customer value, and customer satisfaction during the crisis recovery phase. The insights gathered help evaluate how these factors contribute to enhancing customer satisfaction and value. The data collected will be used exclusively as part of the research requirements for my Master's thesis, which focuses on understanding the role of electronic services in customer experiences in the context of the Bank of Khartoum. All information provided is confidential and used only for academic purposes related to this study.

Therefore, I would greatly appreciate it if you could take a few minutes of your time and participate in completing this questionnaire with honest and accurate answers.

Please read each statement carefully before answering.

Answer the questions honestly and based on your experience. There are no right or wrong answers to the questions below.

For each question, select the answer that best fits your experience on a scale of 1-5 with the following information.

1: Strongly Disagree

2: disagree

3: Neutral

4: agree

5: Strongly agree

Have you ever used the Bank of Khartoum's digital banking services for transactions, such as payments, transfers, or other e-services?

- Yes
- No

PERSONAL DATA

1. Age:
    - 18 - 24
    - 25 - 34
    - 35 - 44
    - 45 – 54
    - 55+
2. Gender:
    - Male
    - Female
3. Level of Education:
    - High School
    - Bachelor's Degree
    - Master's Degree
    - PHD
    - Others
4. Occupation:
    - Student
    - Private Employee
    - Lecturers/Researchers
    - Housewife
    - Government Employee
    - Unemployment
    - self-employed
    - Others

QUESTIONNAIRE

E-Service Quality

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The Bank of Khartoum's online services remain reliable even during difficult times or system disruptions.					
The Bank of Khartoum's online services are consistently accessible whenever needed.					
The Bank of Khartoum's online banking platform is easy to navigate.					

The Bank of Khartoum's online banking platform processes transactions quickly.					
The Bank of Khartoum's online services offer essential features that support my banking needs.					
The speed of transactions on the Bank of Khartoum's online platform meets my expectations.					

E-Trust

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I trust the Bank of Khartoum to process my online transactions securely.					
The security measures of the Bank of Khartoum's online services protect my data.					
The Bank of Khartoum acts in its customers' best interest through its online services.					
The Bank of Khartoum's online services function effectively when needed.					
The information provided by the Bank of Khartoum's online services is accurate and reliable.					
I feel secure making transactions on the Bank of Khartoum's online banking platform.					

Customer Value

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using the Bank of Khartoum's online services improves my banking experience.					
The Bank of Khartoum's online services save me time in managing financial transactions.					
The Bank of Khartoum's online services help me manage my finances effectively.					
The Bank of Khartoum's online banking services provide a					

valuable alternative to traditional banking.					
The benefits of the Bank of Khartoum's online services align with my financial needs.					
The Bank of Khartoum's online services contribute positively to my financial well-being.					

Customer Satisfaction

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am satisfied with the overall quality of the Bank of Khartoum's online services.					
The Bank of Khartoum's online services meet my expectations.					
The Bank of Khartoum effectively responds to my inquiries and concerns through its online services.					
I would recommend the Bank of Khartoum's online services to others.					
My experience with the Bank of Khartoum's online services has been positive.					
The convenience and accessibility of the Bank of Khartoum's online services enhance my banking experience.					

5. **Average Mean Formula**

$$X\sum_{i=1}^{n} Xi$$

$\bar{X}$ = average (mean)

Xi = mean score of each item

n = number of items (here, 5 items)