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The Effect of Analytics-Enabled Service Quality on Mobile Banking Customer Experience: Evidence from the Commercial Bank of Ethiopia

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The Effect of Analytics-Enabled Service Quality on Mobile Banking Customer Experience: Evidence from the Commercial Bank of Ethiopia

A Thesis Submitted To Addis Ababa University College of Commerce Digital Marketing and E-Commerce Department

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DECLARATION

I, Eyerusalem Haile, hereby declare that this thesis entitled "The Effect of Analytics-Enabled Service Quality on Mobile Banking Customer Experience: Evidence from the Commercial Bank of Ethiopia" is my own original work.

I further declare that this work has not been previously submitted, either in part or in full, to any other university or higher education institution for the award of any degree, diploma, or professional qualification. All sources of materials used for the thesis have been duly acknowledged.

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STATEMENT OF CERTIFICATION

This is to certify that Eyerusalem Haile has carried out this research work on the topic "The Effect of Analytics-Enabled Service Quality on Mobile Banking Customer Experience: Evidence from the Commercial Bank of Ethiopia" under my supervision. This work is original and suitable for submission in partial fulfillment of the requirements for the award of the degree of Master of Science in Digital Marketing and E-Commerce.

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LIST OF ACRONYMS

ANOVA: Analysis of Variance

CBE: Commercial Bank of Ethiopia

CX: Customer Experience

MBCX: Mobile Banking Customer Experience

TAM: Technology Acceptance Model

UTAUT: Unified Theory of Acceptance and Use of Technology

SERVQUAL: Service Quality Model

PU: Perceived Usability

PR: Perceived Responsiveness

PP: Perceived Personalization

PS: Perceived Security

PEOU: Perceived Ease of Use

SOR: Stimulus-Organism-Response Model

SSTQUAL: Self-Service Technology Quality

ATM: Automated Teller Machine

POS: Point of Sale

SPSS: Statistical Package for the Social Sciences

ABSTRACT

This study examines how analytics enabled service quality influences the mobile banking customer experience (MBCX) at the Commercial Bank of Ethiopia (CBE). By using a mixed method approach, the research combines descriptive and explanatory designs to identify the factors shaping digital banking experiences. Primary data was collected through Likert-scale questionnaires and open-ended questions from 378 respondents in the Arada District, Addis Ababa. The research is grounded in the Stimulus-Organism-Response (SOR) framework, focusing on four analytics-enabled dimensions: usability, responsiveness, personalization, and security.

Data analysis was performed using SPSS version 25, using correlation and multiple linear regression to determine the relationships between these variables and the overall customer journey. The results show that analytics-enabled perceived usability is the primary driver of customer experience, followed by perceived security and responsiveness. Notably, the impact of personalization was statistically insignificant. The regression model accounts for 68.2% of the variance in customer experience, indicating a strong predictive capability. These findings were further enriched by qualitative feedback, which highlighted user concerns regarding network stability and phishing risks. By emphasizing the role of smart usability and proactive security, this research offers a fresh perspective on data-driven banking in Ethiopia. The findings suggest that CBE should invest in predictive maintenance, biometric security and better-tailored financial tools to enhance satisfaction. Future research is encouraged to explore a broader range of analytics factors across both private and public banks.

Keywords: Analytics-Enabled Service Quality, Mobile Banking Customer Experience, Perceived Usability, Perceived Responsiveness, Perceived Personalization, Perceived Security

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

In this digital era, banking industry is becoming the most convincing service available to each customer on their mobile phone through mobile banking applications and digitalization systems. Traditional banking industry is fading rapidly. Hence, banks are striving to enhance their digital system and upgrading their customers experience as their prime objective (Arcand et al., 2017). Mobile banking service enbales customers to perform their daily banking transactions from wherever they are, so their understanding about the service quality they are experiencing determines trust, satisfaction, and loyalty (Kumalasari et al., 2022).

Mobile banking service quality includes the overall experience of the easiness of the application (usability), responsiveness, personalization and its overall security or safety perceived by customers (Arcand et al., 2017). Most importantly, usability measures customer's primary experience of the mobile banking features, which includes among others, the understanding of how easy customer can access the services available on their mobile. According to previous research, easiness of application systems (interface) and reliability increase customers' loyalty, whereas, the delay of system and frequent errors to proceed with desired service will lead customers to abandon the mobile banking service (Kumalasari et al., 2022).

Responsiveness includes the timely response, security assurance and support by the bank to its customers. When there is a quick response and reliable networking system, it increases customers' satisfaction and their understanding about the importance of the service (Iberahim et al., 2016). In many banks data analytics are used inorder to follow up the mobile banking service delivery and to give timely response for arising problems. This helps to enhance responsiveness and the overall customers' mobile banking experience (Mostafa, 2020).

Personalization indicates the unique service base to customers' needs. It gives information about goods and services available, price discounts and other information individually to each customer based on their profile. Previously conducted researches about mobile banking indicated that when customers receive information based on their interest, customers enjoy the mobile banking experience and also it increases customers' loyalty (Mostafa, 2020). Here, data analytics

also plays a major role by studying customers' bank services experience and individual profile in order to provide customer personalization service.

Similarly, customer's security and privacy are the most crucial Pilars in mobile banking service. Customers's trust, satisfaction, continuance intention and loyalty in mobile banking service are directly determined by security and privacy (Chang & Chen, 2009). Even though the apps are designed well, security issues like fraud, data misuse and network interuptions can reduce their effectiveness and acceptance (Mehari, 2019).

In emerging economies, where mobile banking service is on its emerging stage, service quality and customer skill (experience) to use mobile banking remains the main challenge in expanding financial inclusion (Mostafa, 2020). In Ethiopia, mobile banking service customers are increasing, the poor service quality provided is becoming an obstacle for customers to use the service (Ayinaddis et al., 2023; Ketema, 2020).

Commercial Bank of Ethiopia is a leader in the emerging mobile banking industry of Ethiopia. The bank has over 45 million customer's accounts, among which 10millions of them access the mobile banking service (Commercial Bank of Ethiopia [CBE], 2024). The determination of increasing investment in modern banking technology by CBE is very important for expanding financial inclusion and growing the economy and as well as to maximize its customers' satisfaction. Prior studies highlighted making the mobile banking service convenient to customers helps to provide financial services to the mass and enhance economic participation (Mulatu, 2022).

Previous studies on CBE identified main problems such as unstable network, system log in problems, complex interface and security issues, which decrease the customers experience in mobile banking service (Mehari, 2019; Mulatu, 2022). However, these studies focused on how often customers use mobile banking and on the service satisfaction. They failed to give adequate attention to investigate the effect of analytics enabled service quality dimensions (usability, responsiveness, personalization and security) on mobile banking customer experience (Arcand et al., 2017; Kumalasari et al., 2022; Mostafa, 2020). The existence of inconsistency in application system performance, a gap in personalization service and security concerns at CBE indicates that there needs for deeper analysis of customer experience (Mehari, 2019; Mulatu, 2022).

Hence, the study focused on CBE mobile banking customers as a unit of analysis and examined the effects of analytics enabled service quality dimensions on overall mobile banking customer experience.

1.2 Statement of the Problem

Analytics enabled service quality is becoming crucial to shape customers' overall perception and value for mobile banking. Specifically, usability, responsiveness, personalization and security determine the customers' perception (Mbama et al., 2018). According to Zhou et al. (2021) customers' satisfaction is highly determined by the mobile banking application interface, system quality and its simplicity. These researchers tried to indicate a complicated and unfriendly application system directly decreases the interest of customers to use the service and affect their experience. Similarly, Ojiaku et al. (2023) and Khan et al. (2018) explained that the speed and responsiveness of the mobile banking system increases customer's satisfaction adn retention. They also identified the ease of log in access, instant transaction updates and availability plays a major role to increase customer's satisfaction. Beyond these, customers' awareness about safety and privacy and protection from fraudelent activities increases their trust in the bank and continued customer experience (Geebren et al., 2021).

Though the mobile banking services in Ethiopia is growing rapidly, customers experience challenges remain the main concern especially in terms of security, usability, responsiveness and personalization. Prior studies in Ethiopia mostly pay attention on adoption and initial usage of mobile banking. That means the studies had limited focus about what shapes post adoption customers experience and satisfaction. For instance, Beshir and Zelalem (2020) and Chuko et al. (2025) found service quality and adoption factors. However, they left to indicate in detail about ongoing, post adoption customer experience after they have started using the mobile banking service unexplored. Similarly, Ruey and Thot (2023) examined factors that influence CBE mobile banking adoption. Nevertheless, the aim of their study was focused on first acceptance than deeply exploring the overall experience of users while using the app.

Earlier researches on CBE identified transaction delay, network congestion, interface complexity and security issues as key source of customer complain issues (Mehari, 2019; Mulatu, 2022). The studies focused on customers' adoption and general satisfaction on the service instead of

examining service quality dimensions that can shape customer experience during the continuance use of mobile banking. Puriwat and Tripopsakul (2023) suggest analytics based service quality improvements can simplify customers experience. Also, Arcand et al. (2017) highlighted the app features like easy to use and practicality measured service quality. However, in Ethiopia there is limited empirical evidence that determine a service quality dimension that most strongly influence customer experience (Aynadis et al., 2023; Nigatu et al., 2023).

Above all, in the case of the Commercial Bank of Ethiopia (CBE), there is a noticeable gap between the bank's substantial investment in technology and customers' perceptions of its services. Although the bank employs advanced data monitoring systems, customer experience cannot be said to have improved until clients perceive the service as convenient, responsive and reliable. Because of this, there needs a quantitative customer based investigation to examine the impacts of usability, responsiveness, personalization and security on mobile banking customer experience at CBE. Filling this research gap helps to formulate evidence based guidelines to improve the country's digital banking services and enhance customer satisfaction.

1.3 Research Questions

1. What is the effect of analytics-enabled perceived usability on mobile banking customer experience at CBE?

2. How does analytics-enabled perceived responsiveness influence customer experience with CBE's mobile banking services?

3. What is the relationship between analytics-enabled perceived personalization and customer experience in mobile banking at CBE?

4. How does analytics-enabled perceived security affect overall mobile banking experience at CBE?

1.4 Research Objectives

1.4.1 General Research Objectives

To examine how analytics-enabled service quality dimensions influence mobile banking customer experience at the Commercial Bank of Ethiopia.

1.4.2 Specific Research Objectives

1. To examine the effect of analytics-enabled perceived usability on mobile banking customer experience at CBE.

2. To assess how analytics-enabled perceived responsiveness influences customer experience with CBE's mobile banking services.

3. To analyze the relationship between analytics-enabled perceived personalization and customer experience in mobile banking at CBE.

4. To determine how analytics-enabled perceived security affects overall mobile banking experience at CBE.

1.5 Significance of the Study

This study is important for several reasons.

First, it contributes to academic understanding by focusing on customer experience rather than only adoption or initial usage. While many studies have emphasized why customers start using mobile banking, fewer have examined how analytics-enabled dimensions such as predictive usability and automated responsiveness shape their ongoing experience. By addressing these factors, the study extends theoretical knowledge on intelligent service quality within the Ethiopian banking sector.

Second, the study provides context‑specific evidence for the Commercial Bank of Ethiopia. It helps CBE managers prioritize their digital investments by identifying which perceived analytics features (e.g., personalized insights vs. real-time monitoring) have the greatest impact on customer loyalty. This offers a roadmap for moving the CBE mobile app from a basic transactional tool to an intelligent financial assistant.

Finally, the study has broader relevance for the banking sector and policymakers. Mobile banking is a key driver of financial inclusion in Ethiopia. Improving customer experience

through smart, data-driven service delivery, increases trust in formal digital banking, supporting the country's broader digital transformation and economic participation goals.

1.6 Scope of the Study

This study is delimited to CBE and focuses specifically on mobile banking customer experience in Arada District. Although CBE operates nationwide and across multiple digital channels (ATM, internet banking, POS, etc.), extending the research to all banks and all channels would be resource‐intensive and logistically impractical. While CBE operates nationwide, Arada District is selected because its high density of digitally active customers provides a robust data environment to examine how analytics-enabled service quality influences user experiences.

Substantively, the scope is restricted to four service‐quality dimensions of CBE's mobile banking platform: The research focuses on four analytics-enabled dimensions of CBE's mobile banking: Perceived Usability (adaptive navigation and error guidance), Perceived Responsiveness (automated updates and real-time support), Perceived Personalization (data-driven financial insights) and Perceived Security (proactive fraud monitoring). The study examines how these specific "intelligent" features shape the overall customer experience, trust and loyalty.

Methodologically, the scope is mixed method research approach, explanatory–descriptive, and cross‐sectional. The focus is strictly on perceived service quality, meaning the study measures the customer's evaluation of the technology rather than the technical specifications or internal system logs of the bank's software.

The findings are not generalized to other banks or non‐mobile channels, but they provide evidence‐based guidance for improving mobile banking customer experience at CBE and a reference point for future studies in Ethiopia's banking sector.

1.7 Limitations of the Study

This study is subject to several limitations that should be acknowledged when interpreting the findings.

First, the geographical and institutional scope is narrow. Data were collected only from mobile banking customers of the Commercial Bank of Ethiopia (CBE) in the Arada District. This limits the generalizability of the results to other districts, banks, regions, or countries with different infrastructures, customer profiles, or regulatory environments. The findings therefore reflect the experience of CBE customers in one urban district rather than the entire Ethiopian banking sector.

Second, the study relies primarily on self‐ reported survey data, which is vulnerable to common response biases such as social desirability, acquiescence, and recall bias. Although efforts were made to design clear questions and assure confidentiality, such biases cannot be completely eliminated.

Third, the cross‐ sectional design captures customer perceptions and experiences at a single point in time. This does not account for seasonal effects, system upgrades, changes in network quality, or evolving customer familiarity with the app. Longitudinal data would be required to examine changes in usability, responsiveness, personalization, and security perceptions over time. Additionally, the study measures 'perceived' analytics-enabled quality rather than objective technical performance. Since the data were gathered from customers, the findings reflect user impressions of how 'smart' or 'responsive' the app feels, which may differ from the actual backend technical capabilities or the specific data processing algorithms used by CBE. The study focused on the human experience of the technology rather than a technical audit of the bank's data infrastructure.

Fourth, the study is restricted to one digital channel i.e. CBE's mobile banking application. Other channels such as internet banking, ATM, agency banking and mobile wallets are excluded. The findings therefore cannot be extended to the broader digital banking ecosystem.

Fifth, there were sampling and non‐ response limitations. Since the descriptive findings show the sample disproportionately included younger, more educated or more digitally savvy users, the results may under‐ represent older, less educated, or less active users. Convenience or location‐ based sampling may further constrained representativeness and external validity.

Finally, the study is conducted in a context where research on detailed customer experience constructs is still emerging in Ethiopia. This limits opportunities for direct comparison and

benchmarking across studies, and the findings need to be interpreted within this evolving research environment.

1.8 Definition of key terms

Analytics-Enabled Service Quality: Refers to the integration of data processing and machine learning to improve mobile banking features. While customers may not interact with the underlying data infrastructure, their perceptions of usability, responsiveness, personalization, and security are shaped by the tangible outputs of these analytics such as intuitive navigation, proactive alerts, tailored financial insights, and real-time fraud detection.

Customer Experience (CX) - the whole experience of a customer including the perception and emotions evoked during all the interaction of the customers with a company.

Personalization – is personalized products, services or experiences to meet what the individual customer want and do.

Responsiveness- is defined as how a system or company responds rapidly and properly to customer responses and feedback or shifts in conditions.

Usability- is the ease with which a product or service can be used by customers to interact with the service.

Security- is protection of customer data, of transactions, of users' privacy on mobile banking.

1.9 Organization of the Study

This study is organized into five chapters. Chapter one the foundational part of the research includes background of the study, statement of the problem, research questions, objectives, significance of the study, scope of the study, limitations of the study and definition of key terms. Chapter two presents a review of existing literatures. It includes theoretical framework, empirical review and conceptual framework. Chapter three contains the research methodology, covering the research design, data sources, sampling techniques and methods for data collection and analysis. Chapter four presents result and analysis. Finally, chapter five consists of the summary of findings, conclusion, recommendations, and suggestions for future study.

CHAPTER TWO: LITERATURE REVIEW

INTRODUCTION

This chapter discusses prior studies and literatures written about mobile banking service quality and mobile banking customer experience in detail by focusing on the dimensions' usability, responsiveness, personalization and security. It reviews TAM, UTAUT, SERVQUAL and Customer Experience Theories and explains how these theories help to understand the customer experience in digital banking service. Also the chapter assesses epirical studies in International and Ethiopian context. Moreover, highlights the role of analytics in improving service quality and the challenges banks like CBE faced. Finally, the chapter concludes by summarizing the reviewed studies, identifies key gaps in the literature, and presents the conceptual framework guiding this research.

2.1 Theoretical Framework

2.1.1 Definition and Concepts

2.1.1.1 Mobile banking and mobile banking service quality

Mobile banking is refered as accessing mobile devices to use bank services such as balance inquiry, transfer and utility payments without going to the branch (Geebren et al., 2021). It is highly important because of its convenience and financial inclusion. Specially, for areas that doesn't have adequate banking infrastructure it is a highly important technology (Siano et al., 2020). It enables the low income and rural populations to participate in the financial system by increasing availability (Sukumaran, 2025).

In mobile banking service quality means how well the applications and support services, to meet customers' needs or expectations at the time of their usage of the channel (Orehovački et al., 2022). Using SERVQUAL it is treated as various constructs. These are core dimensions like reliability, responsiveness and assurance in the digital and self service context (Jun & Palacios, 2016). As recent works highlighted mobile banking service quality is not measured only by its accuracy and efficiancy rather by its hedonic and experiential facets like enjoyment and aesthetics (Orehovački et al., 2022; Palamidovska-Sterjadovska et al., 2025).

2.1.1.2 Customer experience

Customer experience (CX) means customers personal feeling that appears when they interact with a firm directly or indirectly. This includes the customers' cognitive, emotional, sensorial, behavioral and social feeling about the firm (Sharma, 2023). Customer experience could also reflect the overall perception developed while using the app interface, carrying out transactions, receiving notifications and interacting with digital support, instead of a onetime interaction (Shahid et al., 2022).

Empirical studies in mobile banking shows CX is developed from the combination of 2 major elements i.e. utilitarian (e.g. fast and easy to use) and emotional (e.g. feel confident, relaxed and in control) elements (Orehovački et al., 2022; Shahid et al., 2022). Convenience, trust and social influence have been perceived as the main factors enhance mobile banking app experience, while app attributes and others considered customer support to play a more limited role (Shahid et al., 2022). Research findings indicates that better mobile banking experience resulting in key relationship outcomes such as customer satisfaction, trust, loyalty, and continued usage or continuance intention (Foroughi et al., 2019; Shahid et al., 2022).

2.1.1.3 Key independent variables

Based on TAM and SERVQUAL the study mobile banking service quality is built on four interrelated dimensions. They are usability, responsiveness, personalization and security. These variables indicate how the use of technology and data analytics improves customer experience and makes the mobile banking service efficient. The following table summarizes these four variables definitions based on the previous works.

Table 2.1 *Key Variables Shaping Mobile Banking Service Experience*

Variable	Definition	References
Perceived Usability	The extent to which a mobile banking platform is easy to use and navigate	(Alalwan et al., 2016; Davis, 1989)
Perceived Responsiveness	The speed and effectiveness with which the bank responds to customer needs and issues	(Iberahim et al., 2016; Parasuraman et al., 1988)
Perceived Personalization	The degree to which services are tailored to individual customer preferences	Albashrawi et al. (2019)
Perceived Security	The customer's perception of the safety and privacy of their transactions and data	(Chang & Chen, 2009; Tertia & Nurbasari, 2022)

Source; compiled by the researcher from reviewed literature

2.1.2 Evolution of Mobile Banking Service Quality

Earlier bank researches employed SERVQUAL dimensions like tangibles, reliability, responsiveness, assurance and empathy to measure the service quality in digital channels. the researches examined and proved the mobile bank services to be beneficial just like the branch service and emerged responsiveness, reliability and assurance/securty as core elements that makes customers satisfied and loyal (Ayinaddis et al., 2023; Zhou et al., 2021).

With the advancement of mobile banking services, all the attentions are moved toward factors unique to each channel. Based on the Technology Acceptance Model (TAM), perceived ease of use and usefulness became central, capturing usability and functional performance (Baabdullah et al., 2019). Research placed importance on usability/interface quality, usefulness, and security/privacy as core determinants of satisfaction and trust (Baabdullah et al., 2019; Shaikh et al., 2022). Other studies identified the effectiveness of the system (loading speed, navigation, visual appeal, security) from information and service quality, confirming their impact on loyalty (Zouari & Abdelhedi, 2020). By expanding their research strategies, such as interprating the

actual app reviews, they measured service quality interms of practicality, design/aesthetics, enjoyment and sociality (Çelik et al., 2025).

Current conceptual model incorporates mobile banking service quality into Stimulus Organism Response (SOR) models and Self‐ Service Technology Quality (SSTQUAL) scales. The app's security, usefulness, interface quality and responsiveness serve as a stimuli and builds positive feelings and trust. This good feeling creates great customer experience and keeps to use the app (De Leon et al., 2020; Palamidovska‐ Sterjadovska et al., 2025).

2.1.3 Theoretical Foundations

2.1.3.1 Technology Acceptance Model (TAM)

Davis (1989) who developed the Technology Acceptance Model (TAM) explains there are 2 factors that made people decide to use the new technology. These are perceived usefulness and perceived ease of use which shape the customers' attitude and intention about the technology. Perceived usefulness Is the extent that a person believes that using the system reduces my work or improves my performace. On the other hand, perceived ease of use is the extent that a person believes using the system doesn't need effort. Even though later models like TAM2 examine in detail cognitive and social determinants of technology usefulness, still the key technology acceptance dreivers are PU and PEOU.

Alalwan et al. (2016) states the desire to use mobile banking services is directly related to the service PU and PEOU. Once the app usability is becoming easy for customers the desire to adopt and use it frequently will increase. Security, trust and risk perceptions included as external variables in TAM. This is because when the app is secure, responsive and reliable users seen as more useful and easy to use. The study conceptually related PEOU with the app usability. That means if the mobile app is user friendly and simple, customers sense usability. This is the same with ease of use construct in TAM.

In a mobile banking context perceived Usefulness is not treated as a separate construct rather it is built as a result of responsiveness, personalization and security:

- Fast and reliable responses of the app lead customers to perform their task quickly and save time, which enables customers to observe the app as useful (Alalwan et al., 2016).

- Personalized content and service of the app increases customers' confidence since they sense it as significant and advantageous for them. Therefore, this enhances perceived usefulness (Kalyanaraman & Sundar, 2006).
- Strong security and privacy reduces the risk customers face and it supports them to belief using mobile banking app is secure and useful. So this leads them to use the service frequently (Abdalla, 2025; Almaiah et al., 2023).

The focus of TAM is mainly on technology adoption. Even if it emphasizes cognitive beliefs and behavioural intentions, limited attention is given to post adoption emotions, experiences and relational aspects like enjoyment, trust and long term relationship quality of customers (Chen et al., 2025; Vaddhano, 2023). Studies that integrate TAM with service quality or ARE Success shows, PU and PEOU are not enough to confirm customers' satisfaction and continued usage. Rather including experiential and quality evaluations is essential (Vaddhano, 2023).

Consequently, TAM serves as an essential foundation for usability in this study. Additionally, it gives an explanation how responsiveness, personalization and security together provides usability to customers. Nonetheless, to understand rich and holistic mobile banking experience of CBE TAM alone is not sufficient. For a better study result user's emotional response, use value and relationship outcomes must take into account.

2.1.3.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

The unified theory of acceptance and use of technology (UTAUT) developed by ventakesh was presented by organizing earlier technology acceptance models. This model sets four main reasons for customers' behavioural intention and use. These are performance expectancy, effort expectancy, social influence and facilitating conditions. They can be changed by demographic factors. Performance expectancy means the benefit in which using a system/technology results in task efficiency. Conversely, effort expectancy describes how easy it is to use the technology.

Social influence is when users face pressure or encouragement from important persons around them like family, friends, colleagues etc. Facilitating conditions on the other hand are organizational and technical supports to use the technology (Baabdullah et al., 2019).

UTAUT2 broaden this framework as convenient to users. By adding hedonic motivation, price value and habit in the model, it helps to explain customers why they use technology. Hedonic motivation describes the satisfaction or fun users obtain from using the technology. Price value means a balance between user's benefit from the service and cost for the service. Habit on the other hand refers an automatic usage created through frequent use of the technology (Venkatesh et al., 2012).

UTAUT and UTAUT2 are models that are used widely in mobile banking studies. Studies show that performance expectancy, effort expectancy, price value, hedonic motivation and habit together with trust and security have a significant impact on customers' mobile banking adoption and continued usage. Various studies extensions include security, risk and trust to describe financial services behaviours. These issues appear as strong drivers in customers' decision to use the service (Merhi et al., 2019).

In mobile banking study, performance expectancy means the benefit and efficiency expected from the service. This is built by the app's usability, responsiveness, personalization and security, since easy to use, fast, personalized and secure apps believed to give perceived value for customers' (Merhi et al., 2019). Effort expectancy has a direct relation with usability because both concepts are focused on measuring customers' expected level of ease and effort to understand and use the app (Baabdullah et al., 2019; Davis, 1989). Facilitating conditions like smart phone access, internet connectivity and support along with habit used as basic conditions for continued usage. When these conditions are met the apps usability, responsiveness, personalization and security can be changed into persistent customer experience (Adiyono et al., 2025).

Just like TAM, UTAUT and UTAUT2 are highly effective in explaining users' interest and technology usage. However, their focus on analyzing emotions, value in use and relational quality (e.g. trust, commitment, and loyalty) is minimal (Vaddhano, 2023). Recent mobile banking studies integrate UTAUT/UTAUT2 models with service quality and customer experience models. This helps to understand in depth the post adoption satisfaction and customer loyalty (Yu et al., 2024).

In this study UTAUT/UTAUT2 models serves as a foundation. These models help to prove usability, responsivenss, personalization and security are the main variables that determine users perceived performance and effort. This is the basic for adoption and usage decision of customers. However, to fully understand CBE's mobile banking customers experience these technology acceptance models are not sufficient. So the study used service quality and customer experience models that considered emotional, cognitive and relational aspects beyond usage demand.

2.1.3.3 SERVQUAL Model

SERVQUAL model, developed by Parasuraman, Zeithaml, and Berry in the late 1980s and early 1990s used as a basic framework to measure service quality. The model measures quality using 5 main parameters. These are reliability (performing a service exactly as promised), responsiveness (being ready to help customers and give fast services), assurance (persuading customers with knowledge and humility), empathy (premium care to customers) and tangibles (staff appearance and equipment). orginally SERVQUAL was developed for traditional face to face services nevertheless, through time it is widely revised to fit for banking and then to digital, electronics and mobile banking. These revisions presented by including new dimensions (like digitalization, compliance and access) and reorganizing the previous factors. These revised models consistently show service quality dimensions in banking (including digital and mobile services) have big role in shaping users' satisfaction and loyalty (Ghimire et al., 2025; Zouari & Abdelhedi, 2020).

In mobile and digital banking, SERVQUAL dimensions can be explicitly aligned with the variables under investigation in the present study:

- Responsiveness in SERVQUAL corresponds directly to the perceived responsiveness variable, encompassing speed of responses, prompt handling of requests, and timely problem resolution in the mobile app environment (Ghimire et al., 2025; Kaur et al., 2021).
- Reliability and assurance jointly underpin aspects of perceived security and system reliability, reflecting not only technical dependability (error free transactions, uptime) but also the sense of safety, trust and confidence that the bank and app convey (Almaiah et al., 2023; Zhou et al., 2021).

- Tangibles translate into app interface design and usability in digital contexts, where visual appearance, layout, navigation and overall design quality become the main "tangible" cues, thus forming an integral part of perceived usability (Barbu et al., 2021; Zhou et al., 2021).
- Empathy is partly realized through personalization, as tailored information, customized offers, and context aware features are digital ways of demonstrating individual attention and care (Palamidovska-Sterjadovska et al., 2025; Zhou et al., 2021).

Empirical work in e banking and mobile banking based on SERVQUAL or its customized variants often finds reliability, responsiveness and assurance/security to be the strongest predictors of satisfaction and loyalty, while tangibles and empathy show more context dependent effects (Almaiah et al., 2023; Zouari & Abdelhedi, 2020). Studies that incorporate mobile specific elements such as interface design, system quality and security into SERVQUAL based models confirm that these quality dimensions significantly influence satisfaction, trust and loyalty intentions in mobile banking (Palamidovska-Sterjadovska et al., 2025; Zhou et al., 2021).

Thus, SERVQUAL and its electronic variants (E SERVQUAL, e banking SERVQUAL) provide direct theoretical grounding for the service quality dimension of this study's framework. By aligning perceived responsiveness, perceived security, usability (via tangibles/interface) and personalization (via empathy) with SERVQUAL dimensions, the model builds on an established service quality tradition while adapting it to analytics enabled mobile banking at CBE.

2.1.3.4 Customer Experience Theory

Customer experience (CX) theory explains experience as holistic perception that occurs when a customer has interactions with the firm in different situations and over time. It combines cognitive, emotional, sensory and behavioral responses (De Keyser et al., 2020; Lemon & Verhoef, 2016). Cx is not limited to a one time service or functional performance. It is rather shows how customers understand and remember the interactions (digital self service, human support and communication) with the provider (Chauhan et al., 2022; Makudza, 2020). Integrative frameworks highlight that CX is multidimensional. This arises from firm controlled stimuli and broader factors outside the firm, which is the core factor of building users' satisfaction, trust, loyalty and long term relationship value (Arcand et al., 2017; Geebren et al.,

2021). The Stimulus–Organism–Response (SOR) framework provides a detailed process view about how customer experience is formed in digital and mobile services.

In mobile banking service quality dimensions can be taken as stimulus(S). By triggering the customers feeling and attitude (Organism, O) and leads to the final response (R) (Palamidovska-Sterjadovska et al., 2025):

- Stimuli (S): In this study analytics enabled service quality dimensions i.e. perceived usability, perceived responsiveness, perceived personalization and perceived security are taken as key Stimuli. This dimension explains how the mobile apps works, looks, responds, adapts and protects users (Almaiah et al., 2023; Palamidovska-Sterjadovska et al., 2025).
- Organism (O): These stimuli shape internal states like satisfaction, trust, affect, perceived value, flow and overall CX in mobile banking (Baabdullah et al., 2019; Zhou et al., 2021). For example, secure and responsive services increases trust and satisfaction. On the other hand, personalized and usable interfaces enhance the customers' perceived value and positive emotions. Bringing together form a deep and rich CX.
- Response (R): The intenal states in turn cause practical results such as continued mobile banking usage, loyalty, positive word-of-mouth and deeper relationship engagement with the bank (Baabdullah et al., 2019; Zhou et al., 2021). As empirical works confirmed, in digital banking the basis of loyalty is customer experience. A good customer experience leads to satisfaction and trust which then creates lasting relationships that lead to referrals to others (Mbama et al., 2018; Zhou et al., 2021).

The study framework is built on SOR-CX model. The four service quality dimensions are considered as influencers of customers (Stimuli, S). This impacts the organism, which is explained by customers' mobile banking experience and includes satisfaction, trust and affective-cognitive evaluations. finally, Organism reinforce Response i.e. continue usage intention, loyalty and positive word of mouth about CBE mobile banking services (Arcand et al., 2017; Zhou et al., 2021).

Integrating the theoretical foundations, the SOR-CX perspective with SERVQUAL/E-SERVQUAL models the study used as primary framework. This integrated view puts clearly the

pathway from service quality to internal experience to behavioral outcomes. That means it reflects the study's focus analytics enabled usability, responsiveness, personalization and security as antecedents of mobile banking CX and loyalty (Arcand et al., 2017; Mostafa, 2020). SERVQUAL/E-SERVQUAL provides the study's service quality dimesions (reliability/assurance, responsiveness, tangibles/interface, and empathy/personalization), where as CX/SOR explains how these analytics enabled quality dimensions'/stimuli form satisfaction, trust and loyalty responses (Arcand et al., 2017; Jun & Palacios, 2016; Mostafa, 2020).

Even though TAM and UTAUT are central for usability/effort expectancy and perceived usefulness/performance expectancy in technology based services, but they are inadequate to explain ongoing customer experience, emotions and relationship quality in mobile banking usage (Souiden et al., 2020). Therefore, the study used them as a supporting theory and fills the gap by using CX/SOR framework.

2.1.4 Analytics-Enabled Service Quality in Mobile Banking

Analytics enabled service quality in mobile banking means improving service reliability, responsiveness, security and usability by analyzing users behavioral, textual and payment information through modern analytics techniques and AI. These data driven abilities allow banks to monitor the system in real time, offer personalized services to their customers, early identify system failure, detect fraud and improve overall service, system and information (Ezechi et al., 2025; Mostafa, 2020).

By following behavioral and transactional activities of customers, banks can identify in advance potential issues behind irregular actions. This helps to ensure that the customer's safety continues without compromise and service interruption (Palamidovska-Sterjadovska et al., 2025). AI-driven personalization provides personalized content and interface by studying user's history and interest. This is done by making the technology feel like human and caring to increase relevance and perceived value (Mostafa, 2020). To identify users' usability and design problems, text mining of app reviews is essential. This helps to improve the service and manage customer complaints (Çelik et al., 2025). Additionally, analyzing surveys, which converts user feelings to action, allows for service improvement (Mostafa, 2020).

Analytics enabled service quality in mobile banking indicates a strategic change from reactive to proactive approaches. The usual service delivery process is focused on giving solutions after the problems occur. Kalra and Arora (2025) argue AI driven solutions are bringing a big change in predictive customer service by identifying and preventing risks earlier. The implementation of machine learning technology on behavioral and transactional data increases bank service quality. According to Ezechi et al. (2025), for strong security and decreasing frauds, real time system monitoring and early anomaly detections have high impact as they are done using data analytics. The benefit of this proactive shift is not limited to technical strength rather it improves overall customer experience. Shin et al. (2017) highlights addressing issues before they arise is a key to prevent service disruption. This significantly increases customers trust and satisfaction.

Besides this, the trend fits well with the overall growth of IT service management. In his work Familoni (2024) indicates because of predictive analytics solving problems before they occur helps for continuous service improvement. The bank service shifts from reactive to proactive engagement can change the user's experience from the root. By doing this customer can get non disruptive and preventive service rather than solving a problem when it occurs. From a CX and SOR perspective, analytics enabled service quality strengths Stimuli such as system stability, information accuracy, responsiveness, assurance and personalization. These in turn bring satisfaction, trust, loyalty and positive word of mouth (Arcand et al., 2017; Ezechi et al., 2025; Mostafa, 2020).

Recent SOR based models confirmed service quality stimuli have high impact in customers' behaviors like attitude and loyalty. By relating analytics enabled service quality dimensions with overall customer experience results, acts as a primary strategic tool for CX transformation (Palamidovska‐Sterjadovska et al., 2025).

2.2 Empirical Review

2.2.1 Mobile Banking Service Quality and CX

Empirical studies show mobile banking service quality is not measured by a single standard instead it is a multifaceted concept. It includes usability/ease of use, responsiveness, personalization, security/privacy, information and system quality. Arcand et al. (2017) studied using 375 mobile banking users survey data from Canada and structural modeling. Thus, they

have examined how service quality variables like security/ privacy, practicity, enjoyment and sociality shape customer relationship. Their study results show that utilitarian factors like security and practicity build trust. In contrast, hedonic factors like enjoyment and sociality increases customers' commitment and satisfaction. This implies the dual role of functional and experiential quality to retain customers. On the other hand, Kumalasari et al. (2022), researched 176 bank Mandiri users in Indonesia using multiple regression analysis and presented another view. The study shows system quality, information quality and service quality enhances customers' satisfaction highly. It in turn serves as a strengthening for loyalty.

Mostafa (2020), based on survey data from 301 mobile banking customers in Egypt, explained service quality encourage customers to actively participate in the value co-creation process. In his mediation/moderation analysis showed that ease of use, usefulness, security/privacy and enjoyment improves customers' attitude (mediator) to mobile banking and makes them ready for value co-creation intentions.

Collectively, the studies from Canada, Indonesia and Egypt using a large number of users and quantitative methods showed the same result. They confirmed that mobile banking service quality whether stated in hedonic, utilitarian or relational dimensions, it is fundamental for strengthening trust, satisfaction, loyalty and long term customer engagement. As a result, it will take CX to a higher level.

2.2.2 Usability and Mobile Banking Experience

Empirical studies consistently demonstrate usability or ease of use is the main deciding point for users in their mobile banking experience. Srivastava and Vishnani (2021), investigated 258 respondents survey data in Northern India using regression based analysis with process macro found service quality dimensions like ease of use and security highly enhance satisfaction. Their study highlighted satisfaction acts as a partial mediator between service quality and continuance intention relationship. The results underline for sustain mobile banking usage it is important to have user friendly interfaces and secure processes.

Similarly, Johannes et al. (2018), in Surabaya analyzed 200 mobile banking users' questionnaire data using SPSS and AMOS software, verified the importance of usability in strengthening loyalty. The study shows that usability with customer satisfaction, trust and service quality,

positively influences loyalty. Also it is a pathway from system design to long term relational outcomes. Broadening this perspective to a wider usability evaluation, Oyekunle et al. (2024), evaluated 10 main mobile apps found in Nigeria with a sample of 200 users. The study supported by descriptive statistical analysis examined navigation simplicity, error prevention, customization, and security variables. Findings observed high variations between applications. Specially usability features like error handling and design clarity are verified as critical for user experiences and continued usage intentions. Generally, all India, Indonesia and Nigeria studies are established on cross sectional survey design with questionnaire and quantitative analysis methods. They confirmed usability in mobile banking is a critical driver of loyalty, satisfaction and sustained customer experience.

2.2.3 Responsiveness and Mobile Banking Experience

Responsiveness in mobile banking is repeatedly mentioned in various studies as a critical dimension. Khan et al. (2018) in Bangladesh by analyzing 240 respondents structured data and using a partial least squares structural equation modeling (PLS-SEM) confirmed that responsiveness is a key to customer satisfaction. Also the study shows responsiveness together with assurance and reliability has a strong positive influence on customer satisfaction with responsiveness playing a major role. After all, this leads to a higher loyalty. In Indonesia Ronny (2022) a study conducted with 582 mobile banking users' participation, examined the effects of responsiveness, security, reliability, convenience and aesthetics on satisfaction using SEM analysis method. Based on the finding, responsiveness together with ease of use and security significantly increases satisfaction. It shows for a better CX improving fast logins, real time updates and stable system performance is important. Expanding to the African context, Ojiaku et al. (2023) in South Eastern Nigeria conducted an explanatory survey on 395 commercial bank customers. The findings supported by correlation and regression analysis show that responsiveness, system quality and information quality positively affect customer retention. Where as dimensions such as reliability and privacy did not play a significant role in retaining customers. Overall, studies found from South Asia, South East Asia and Afirca, includes 240 to 600 participants by employed a cross secional survey and used a quantitative analyzing methods like SEM and regression. Their findings confirmed responsiveness is a main driver for satisfaction, loyalty and retention that means, it is a key to mobile banking customer experience.

2.2.4 Personalization and Mobile Banking Experience

Recent works connects personalization in mobile banking with the use of advanced analytics and Artificial Intelligence. De Leon et al. (2020), based on a survey data from 200 mobile banking users by applying AMOS and SEM analysis highlighted self service technology service quality (SSTQUAL) dimensions significance. The results revealed that dimensions like perceived personalization of information and functionality highly increases satisfaction and perceived value. This proved that for a better application experience tailored content and features are important. Expanding this view, Mostafa (2020) examined 301 Egyptian respondents using mediator and moderator analysis and shows service quality dimensions like ease of use, usefulness, security/privacy and enjoyment initiated customers' value co-creation. His findings indicate that analytics enabled personalization (offers and notifications) increases percieved relevance and enjoyment which then strengthen engagement and relationship. Mathivadhani et al. (2025) analyzed 450 private bank customers' survey data in Chennai using regression and correlation analysis. The results indicate AI enabled personalization specially customized recommendations, improved security and personalized alerts, enhances customers' satisfaction significantly. Also most of the respondents report they are delighted by AI service than traditional mobile banking service. On the other hand, Chang and Chen (2009) suggested personalization's benefits are based on interface quality and security perceptions. If users worry about their privacy concerns, personalization may erode trust instead of building. All together show, personalization, whether enabled by analytics or AI, it has a significant impact for customer satisfaction and engagement. However, the effectiveness of this service is depends on interface quality and data security.

2.2.5 Security and Mobile Banking Experience

In mobile banking and e-commerce contexts, security and privacy continuously mentioned as core points in building customers' satisfaction and trust. Chang and Chen (2009), using a web based survey and SEM analysis validated that interface quality and security enhances customers' satisfaction and loyalty. In their study indicate customers switching costs moderating satisfaction and loyalty. Subsequent mobile banking studies use same dimesions to explain customers trust and ongoing usage. Almaiah et al. (2023), using TAM and SEM analysis method verified that perceived risk, security and trust are foundational for continuance intention. The findings show

security more than just directly reminding customer for continual use, it has also high effect in increasing trust in the bank.

Further strengthening this idea, Lim et al. (2025) employed surveys and interviews in Malaysia shows data protection, privacy and transaction safety put high influence in the customers' peace of mind and willingness to adopt mobile banking. In their study safety strategies like multi factor authentication and data encryption can play a major role in strengthening customers trust in the system. Evidence from Milly et al. (2021) confirmed perceived risk significantly decreases customers' mobile banking usage. Intention to use serves as mediating between perceived risk and actual usage, which indicates to make the service sustain decreasing the customers' perceived risk, is important. The findings match with behavioral models that explains reducing strong security perceptions builds trust. From a technological point, Swamy (2025) explained AI driven fraud detection and real time risk assessment create great capacity for banks. These techniques supported by predictive analytics and machine learning allow banks to increase security and responsiveness, there by enhances customers trust and experience.

2.2.6 Analytics-Enabled Service Quality and CX Management

Palamidovska Sterjadovska et al. (2025) examined a research synthesis of 71 studies on mobile banking service quality. The researchers showed how service quality dimensions, system performance and customers' characteristics influence customer attitudes, trust, brand connection and behaviors using SOR framework. In addition, the study suggested for future studies to use new service quality dimensions, mixed methods, take into account demographic and cultural differences and developing measurement tools suitable for the modern banking context. Hussain et al. (2023) in Pakistan investigated over 50,000 app reviews using text mining. Based on the finding problems related to responsiveness, reliability and usability are repeated reasons for customers negative CX. Then it clearly shows the role of analytics in identifying practical use case bottlenecks. In addition, a survey conducted by Zhou et al. (2021) and Kumalasari et al. (2022) confirmed that system quality, information quality and service quality significantly enhance customer satisfaction and loyalty. They used Structural Equation Modeling (SEM) and clearly showed the causal pathways starting from perceived quality up to continued usage intention. Abu-Taieh et al. (2022) takes the research to the next level by integrating UTAUT, TPB and TAM models and service quality dimensions with machine learning to predict

continued intention. Their survey in Jordan mobile banking users verified that data analytics applied in survey data can help to understand and grasp robust insights about drivers of customer experience. Adeniran et al. (2024) explained in detail how banks implement advanced data analytical methods in to practice. Banks using behavioral analytics, clustering, predictive modeling and natural language processing can segment customers, predict customers needs and give personalize offers. This helps to provide personalized offering to every customer there by increases customer satisfaction and significantly strengthening loyalty. Similarly, Ezechi et al. (2025) indicate the role of descriptive, predictive and prescriptive data analytics methods to improve service quality. The study confirmed these analytics methods have high significance in strengthening customer relationship management, operational efficiency, and risk management. Collectively, the studies signify data analytics has 2 functions in banks'. First they serve as internal tools to monitor and improve serivce quality and second act as external tools to enable personalization, responsiveness and security. By integrating service quality dimensions with advance data analytics methods, they indicate how mobile banking providers shape CX outcomes like satisfaction, trust, loyalty and retention.

Empirical studies in emerging markets and Ethiopia is highly concentrated on technology adoption and overall satisfaction. But they give limited attention to detail customer experience dimensions. For instance, Mehari (2019), investigated determinants of mobile banking usage frequency at CBE and found network interruptions, login difficulties and complex interfaces highly reduced transaction frequency and satisfaction. Yet, the study was not analyzed individually at a model level experience focused dimensions such as usability, responsiveness, personalization and security. Similarly, Mulatu (2022) utilized analytics to mobile banking usage behavior at CBE. The study verified inconsistent app performance, low personalization and security issues are still the widespread problems. Still the study focused on usage and overall satisfaction than analyzing and developing comprehensive CX framework. Beshir and Zelalem (2020) studied E-banking service quality in Bahir Dar city using SERVQUAL dimensions and found service quality have high impact on customer satisfaction and loyalty. However, the study did not analyze ongoing mobile banking CX beyond adoption and general satisfaction. Ruey and Thot (2023) examined mobile banking adoption factors. Thus, identified for initial intention, perceived usefulness, ease of use, perceived risk and social influence are key drivers. Still their work doesn’t consider post adoption experience or analytics enabled service quality dimension.

Also Chuko et al. (2025) studied mobile banking adoption in Tullu Bollo Town and found usefulness, trust and service quality are predictors of service quality. But the study viewed service quality as a single construct rather than breaking it down to different dimensions and examining deeper experiential constructs such as flow or relationship quality. Ketema (2020) assessed Abyssinia bank mobile banking service quality during COVID- 19 and confirmed service quality dimensions have high significance on customer satisfaction. As the study's analysis is limited to general dimensions, there was a gap in refining key mobile banking experience factors.

Ayinaddis et al. (2023) investigated E-banking service quality in Ethiopia's developing banking industry using 385 participants' survey data and Multinominal Logistic Regression (MLR). The study confirmed responsiveness, reliability, security and privacy, speed and conveneience have positive significance on customer satisfaction and these leads to layalty. On the other hand, system abailability, ease of use and service charges were not significant based on statistical analysis. Even if the study indicates service quality dimensions' effect on satisfaction and loyalty, it doesn't examine analytics enabled customer experiences.

Generally, studies in Ethiopia involve samples from 150 to 400 and used a strong quantitative methods i.e. structured questionnaires, regression and SEM models. These studies repeatedly validated service quality is core to satisfaction, loyalty and adoption. However, their focus was mainly on adoption and general satisfaction which implies there is a gap in analyzing analytics enabled service quality dimensions with detailed results of CX.

2.2.7 Research Gap

Many Ethiopian and CBE studies focused a lot on adoption and have mainly been limited in analyzing initial intention to use and general satisfaction. However, attention given to ongoing customer experience and its varied aspects is less. Existing local studies mostly see service quality as a broad construct. There is a gap in analyzing dimensions like usability, responsiveness, personalization and security individually. Additionally, which of the dimensions most significantly determines customers experience, trust and loyalty in the Ethiopian context is not examined. Even though international studies show capabilities of analytics, text mining and Artificial Intelligence in mobile banking services practically, there is a scarce empirical work in

Ethiopian banking sector that analyzed by linking analytics enabled service quality and customer experience. This study filled the gap identified above by clearly focusing on mobile banking customer experience at CBE. The study examined experience through customer based measures like satisfaction, trust and perceived value for interpretation. The study examined 4 dimensions of analytics enabled service quality, Usability, responsiveness, personalization and security individually. These dimensions were empirically examined there individual and joint effect on customers' experience through quantitative survey data and regression modeling.

While previous researchers in Ethiopia already mentioned issues like network interruptions, complex interfaces, limited personalization and security, but still hasn't systematically quantified how these issues shape a person's experience over time.

2.3 Conceptual Framework

The conceptual framework for this study is firmly grounded in established technological acceptance and service quality theories; specifically, the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), the E-SERVQUAL and and the Stimulus-Organism-Response (SOR) framework, as well as relevant empirical insights from previous works in the digital banking literature. Drawing from these foundational theories and prior studies, the study framework encompasses analytics-enabled mobile banking service quality dimensions namely, Perceived Usability, Perceived Responsiveness, Perceived Personalization, and Perceived Security as independent variables.

These specific variables were selected and adapted because they have been rigorously validated by previous empirical studies in the digital banking context, such as the works of Arcand et al. (2017) and Mostafa (2020). Additionally, by taking Mobile banking customer experience at CBE as the dependent variable, the study examined the impacts of these theoretically supported service quality dimensions on the overall customer experience.

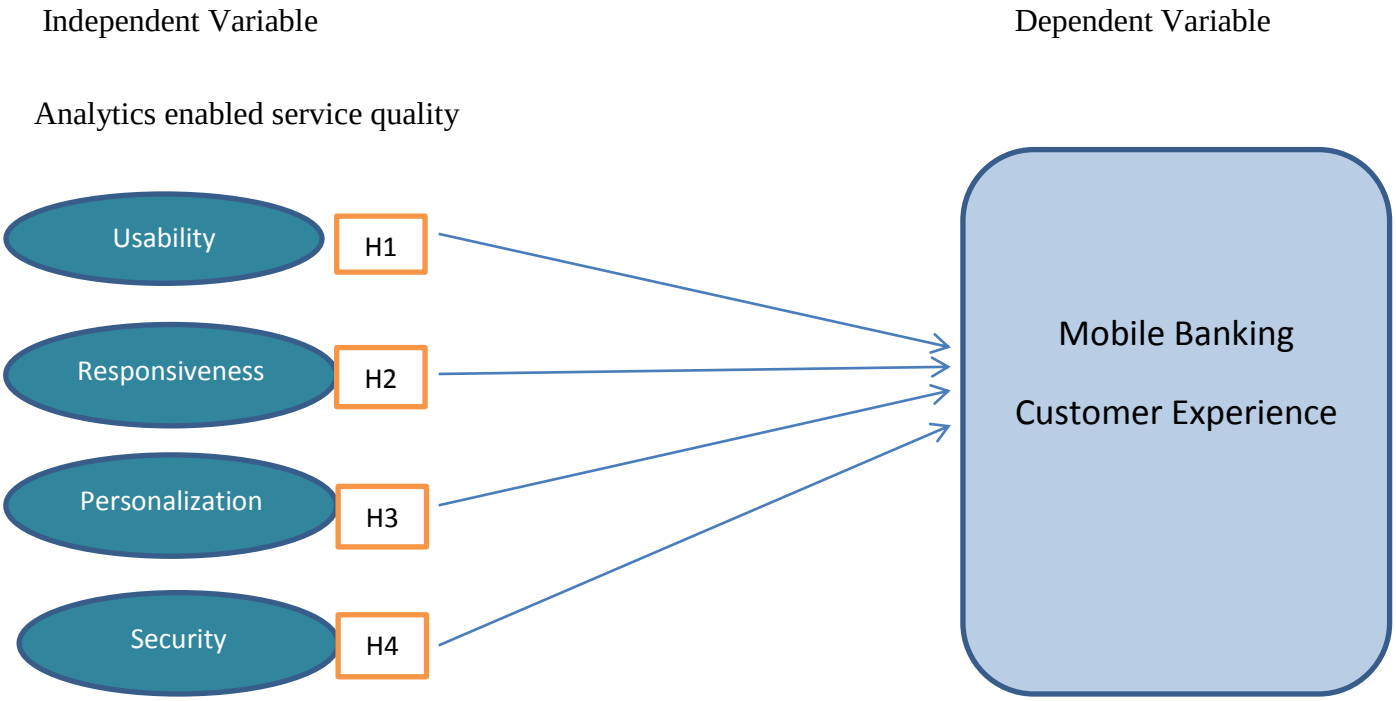


Figure 2. 1 *Conceptual Framework of the Study*

Source; (Adapted by the researcher based on the SOR framework, 2026)

2.4 Hypothesis Development

H1: Analytics-enabled perceived usability has a positive and significant effect on mobile banking customer experience.

Customers usually evaluate their degital application experience based on how they enteract with the application. According to Mostafa (2020), easily accessible featuring of the application increases the desire to use it frequently. When commercial banks apply a real time behavioral analytics inorder to make the transaction process easier, customers will show more interest to use the application over and again. By which it helps to maximize their experience (Adeniran et al., 2024).

H2: Analytics-enabled perceived responsiveness has a positive and significant effect on mobile banking customer experience.

From the customers perspective perceived responsiveness is evaluated by the mobile banking platform's speed of devlivering feedback and managing transactional interruptions.

Palamidovska-Micevska et al. (2025) emphasized E-SERVQUAL is deeply determined by the communication speed and system responsiveness. To effectively shift from problem fixing to prevent them before happen, banks should implement automated error detection mechanisms with predictive server monitoring. These technical enhancedments are directly corelated with continuity and overall quality of CX (Mostafa, 2020).

H3: Analytics-enabled perceived personalization has a positive and significant effect on mobile banking customer experience.

Banks appropriately use users' data to give personalized financial guidance for customers through their digital apps. This perceived personalization transforms the digital app from standard tool to interactive platforms. Zhou (2021) proved that customers are motivated to use applications frequently and strengthen brand attachement because of customized and high utility features. Banks, who integrates advanced data analytics to give custom dashboards automated product recommendations, goes beyond basic service supply. This strategy ensures an intuitive experience that matches with individual customers's preferences (Arcand et al., 2017).

H4: Analytics-enabled perceived security has a positive and significant effect on mobile banking customer experience.

Inorder to build consumers' confidence in digital banking, it is important to ensure data privacy and structural system defense. According to Arcand et al. (2017), users expect their mobile banking apps to be secure and private. To define whether users' perceive mobile services as reliable or not, effective threat mitigation and privacy protection are base requirements. When financial institutions adopt behvioral threat monitoring and live risk mapping, they are not only block cyber threats but also reduce users' vulnerability feelings. Therfore, this perceived security becomes a core driver for overall users experience and helps to build long term confidence on digital banking services (Zhou, 2021).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Methodology

Research commonly uses three methods. These are quantitative, qualitative, and mixed methods approaches. The outcomes are consistent across all three approaches; the appropriate method is determined by the objective of the study and the nature of the problem (Creswell, 2005). In this research, the researcher used a mixed-method approach. A quantitative method is adopted to examine the relationship between measurable variables such as responsiveness, personalization, usability and security. The researcher also used a qualitative approach to further investigate customers' specific suggestions and experiences through open-ended questions, which provides a comprehensive understanding of the CBE's mobile banking customers.

3.2 Research Design

As noted by Klopper (2008), a research design is the strategic roadmap which provides the structural foundation for the study. Babbie (2007) in his part classifies research design into three types; descriptive, exploratory and explanatory. According to these segments, the researcher primarily used an explanatory approach, and complemented by descriptive elements. The main reason why this study adopted explanatory approach for the case of CBE's mobile banking customer experience was to investigate the causal effect of analytics enabled the service quality dimensions, focused on perceived usability, responsiveness, personalization and security. This approach clearly identifies and explains the relationships between variables. Meanwhile in order to summarize and describe CBE's Arada District customer's perceptions, the study employed a descriptive research design. The responses gathered from the open ended questions, were described in detail, in order to support the quantitative finding.

The research was conducted within a specific time frame by using a cros-sectional survey design. This methodology proved effective while obtaining the desired information of the Arada District mobile banking customers experience.

3.3 Population and Sampling

Population is defined as the complete group which the characteristics that a sample would satisfy for a specific analysis (Willie, 2023). Therefore, the target population for this study comprised of a particular segment of the overall population, to which the results were intended to apply.

3.3.1 Population, Sampling Frame, and Sampling Unit

The defined population group for this study comprised of registered mobile banking customers of CBE within the Arada District. During the course of the study, about 585,326 mobile banking users were registered. Because of its large size and wide geographic spread, a stratified sampling strategy was used across the 40 CBE branches inside as strata. This method assured the representation of customers across the district. A total of 400 respondents were selected, with 10 participants allocated to each branch.

While selecting individual respondents from branches, a convenience sampling approach (specifically, intercept sampling) was applied. In the course of data collection, customers visiting the branches were screened to determine whether they were mobile banking users or not. Thereafter, eligible visitors were invited to complete the questionnaire to the limit of 10 customers in each branch. This approach provided a practical and feasible way to access the target respondents within each stratum.

3.3.2 Sample Size Determination

The research used Yamane's (1967) sample size formula. The formula is applicable when the total population size is known. The formula is defined as;

$$n=N/(1+Ne^2)$$

Where, n is the required sample size, N is the population size and e the desired level of precision (the margin of error).

In this study, the total population of registered mobile banking users in the Arada District was N = 585,326. Using a 95% confidence level with a margin of error of e = 0.05 (a standard parameter in social science research), the calculation resulted:

$$n = \frac{585{,}326}{1+585{,}326*(0.05)2} \approx 399.7$$

For this study the researcher established a sample size of 400. The Arada District has 40 branches and it has been assigned 10 respondents per branch. This sample size provided sufficient statistical power to conduct the planned descriptive, correlation and regression analyses.

3.4 Data Types and Sources

Data collection can be made through primary or secondary sources (Kothari, 2004). Hence, this study primarily used primary data to conduct the research. Through a structured questionnaire, primary data were obtained directly from the customers. These data compiled comprehensive customers' perceptions and experiences regarding analytics-enabled service quality factors composed of usability, responsiveness, personalization, and security with the addition of customers' intensive experience.

3.5 Data Collection Methods

Hence the reliability and interpretability of the results are critically dependent on the quality of the data, it is mandatory to adopt the right data collection tools (Kumar, 2004). For this study, primary data was gathered from mobile banking customers in CBE's Arada District using a structured questionnaire. To make sure the findings represent the whole district, the researcher used a stratified approach to collect a total of 400 responses across 40 branches, targeting exactly 10 participants from each branch.

At the branch level, participants were chosen using a convenience sampling technique (intercept sampling). During the data collection period, the researcher visited the selected branches and directly approached customers as they arrived at the location.

Before handing out the survey, the researcher screened the customers to make sure they qualified for the study. To take part, individuals had to be active CBE mobile banking users and willing to participate. If a customer did not meet the criteria or did not want to join, the researcher simply approached the next available customer entering the branch. This straightforward process of

approaching and screening visitors was repeated at each location until the target quota of 10 valid responses per branch was successfully reached.

3.6 Data Analysis Methods

Quantitative data obtained from the survey were analyzed using SPSS Statistics version 25 software. Descriptive statistics were utilized to summarize key variables regarding analytics enabled perceived usability, responsiveness, personalization, security and overall customer experience. Correlation analyses were conducted to examine the relationships among these service‐quality dimensions and customer experience. Multiple regression analysis was employed to assess the effect of perceived usability, responsiveness, personalization and security on overall mobile banking customer experience and trust.

3.7 Validity and Reliabilty

Validity and reliability assessments were undertaken to confirm the research instrument's consistency and accuracy in assessing the focal dimensions of the constructs. Previously proved scales were employed for the adoption of the questionnaire to ensure the validity (Arcand et al., 2017; Ayinaddis et al., 2023; Mostafa, 2020; Palamidovska-sterjadoska et al., 2025; Zhou et al., 2021). Moreover, the questionnaires were evaluated by the research advisor to ensure its suitability for the study objective and its clarity. Based on which, necessary adjustments were made.

Accordingly, Cronbach's Alpha, a well-established statistical measure instrument were used for the assurance of questionnaires' reliability and high internal consistency. Nunnally (1978), indicated that a Cronbach's Alpha value 0.70 or higher implies that the instrument is considered reliable and effectively measuring the target variables without substantial measurement error. Hence, the comprehensive reliability results for the 32 items included in this study are presented as follows;

Table 3.1 *Reliability Statistics of Variables*

Dimensions	No. of Items	Cronbach's Alpha
Analytics Enabled Perceived Usability	7	0.852
Analytics Enabled Perceived Responsiveness	6	0.800
Analytics Enabled Perceived Personalization	6	0.961
Analytics Enabled Perceived Security	7	0.839
Mobile Banking CX	6	0.909
Total	**32**	**0.951**

Source; Cronbach's alpha SPSS V25 analysis result

As shown in Table 3.1 above, all research scales in the study scored are above 0.70 and the overall reliability of the questionnaire is 0.951. This indicates that the instrument is highly reliabile. So, the collected data is suitable for correlation and regression analysis.

3.8 Ethical Considerations

This study was carried out in compliance with fundamental ethical standards for protecting participants' rights. Before completing the questionnaire, there have been brief consent about the purpose of the study and their privacy was explained. Furthermore, participants' rights to withdraw or decline and answer specific questions were also explained. In addition, to ensure participants confident, personal identifications information were omitted to be recorded. Participants were also assured that all collected data remains confidential, and used only for research purpose and never shared with third parties. Finally, to meet the study's ethical requirements, the researcher prioritized data accuracy and accountability, systematically analyzing the information to prevent bias and providing a faithful representation of the findings.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

INTRODUCTION

This research focuses on the mobile banking service customers of Commercial Bank of Ethiopia (CBE) and examines their experience based on the four quality dimensions. In order to ensure the study is meaningful and reliable the researcher established appropriate literature frameworks and designed the research methodology in chapter two and three. Following the established methods and strategies, the data gathered through the questionnaire have been analyzed and presented in this section.

Questionnaire Response Rates

From the total of 400 distributed questionnaires, 378 were correctly completed and returned. This represents a 94.8% response rate. This provides a strong basis for the analysis that follows.

4.1 Demographic Characteristics of Respondents

This section of the study focuses on the general background and profile of the participants. The data includes participants' gender to identify potential differences in perspective, as well as age to understand usage patterns across different generational groups. In addition, educational level offers insight into participant's knowledge background and their ability to comprehend information. Furthermore, employment sector and service experience help explain how work responsibilities and length of service use influence their feedback.

Additionally, usage frequency was included to better understand how regulatory customers interact with the service. Frequent transaction types were also examined to identify the service areas most commonly used by respondents. Similarly, contact with support services and overall satisfaction levels were assessed to evaluate the quality of institutional support and the general experience of users;

Table 4. 1 *Demographic Characteristics of Respondents*

Description	Items	Frequency	Percent
Gender	Male	207	54.8
	Female	171	45.2
	Total	378	100.0
Age	18-24	50	13.2
	25-34	136	36.0
	35-44	128	33.8
	45-54	46	12.2
	55 or above	18	4.8
	Total	378	100.0
Education Level	No formal education	16	4.2
	Primary school completed	67	17.7
	Secondary school completed	53	14.0
	College diploma/degree	127	33.6
	Master's degree or above	115	30.4
	Total	378	100.0
Occupation	Student	21	5.6
	Employed (public sector)	164	43.4
	Employed (private sector)	101	26.7
	Self-employed/business owner	78	20.6
	Unemployed/other	14	3.7
	Total	378	100.0
Years of Usage	Less than 6 months	3	0.8
	6–12 months	29	7.7
	1–2 years	52	13.8
	2–4 years	74	19.6
	More than 4 years	220	58.2
	Total	378	100
Usage Frequency	Daily	220	58.2
	Weekly	71	18.8
	Monthly	36	9.5
	Rarely	51	13.5
	Total	378	100.0
Frequent Transaction Type	Balance Inquiry	5	1.3
	Fund transfer	53	14.0
	Bill payment	12	3.2
	Airtime top-up	19	5.0
	Account management	0	0
	All	289	76.5
	Total	378	100.0
Contact Support	Yes	258	68.3
	No	120	31.7
	Total	378	100.0
Support Satisfaction (If yes)	Very Dissatisfied	18	4.8
	Dissatisfied	29	7.7
	Neutral	41	10.8
	Satisfied	92	24.3
	Very Satisfied	78	20.6
	Not Applicable	120	31.7
	Total	378	100.0

Source; (Survey Data, 2026)

Table 4.1 explains that, in terms of gender distribution, 54.8% (207) of the participants were male, while 45.2% (171) were female. This composition ensures a balanced representation and incorporates perspectives from both genders. Regarding the age distribution, the majority of participants fall within the youth and young adult categories specifically those aged 25-34 (36%) and 35-44 (33.8%), who collectively account for a significant proportion of the total sample. This indicates that the study primarily reflects the most economically active and technologically engaged segment of the population.

When we examine the educational level it indicates that most participants are highly educated. About 33.6% have a college diploma or a bachelor's degree, while 30.4 % hold a master's degree or higher. This education levels implies the respondent's capacity to comprehend the research questionnaires and provide appropriate responses. Regarding participants' occupation status, 43.4% (164) consists of government employees, which makes it the largest group, and about 26.7 %(101) are a private company employees, whereas the remaining 20.6% (78) are self-employed.

With regard to participants' engagement with the service, it shows that most of them have a long- term experience with service. About 58.2% of respondents have more than four years of service use experience in daily basis. It confirms that they have sufficient awareness and experience about service quality and related issues. Furthermore, the vast majority (76.5%) perform all types of transactions indicates the comprehensive utility of the service.

Finally, the study evaluated the accessibility of customer support services and revealed that 68.3% of participants had service assistance at some point. Among those who utilized these services, a considerable portion reported positive satisfaction levels, with 24.3% indicating satisfaction and 20.6% expressing a high level of satisfaction. These findings imply that the institution's responsiveness to customers' complaints and inquiries is perceived favorably.

4.2 Descriptive Statistics

Analyzing data through descriptive statistics is a vital approach for presenting raw data in a meaningful manner and understanding the overall perspectives of the participants. In this study, the Mean and Standard Deviation were utilized to quantitatively describe the responses provided by participants for the various questionnaire items. The Mean indicates the central tendency of

the responses (e.g., whether the majority of respondents lean toward "Agree" or "Disagree"). While the Standard Deviation measures the degree of dispersion, showing how close or far the individual responses are from the average.

Table 4. 2 *Descriptive Statistics of dependent and independent variables*

Descriptive Statistics			
	N	Mean	Std. Deviation
PU	378	3.70	.84
PR	378	3.53	.77
PP	378	2.99	1.25
PS	378	3.35	.87
MBCX	378	3.77	.92

Source; (Survey Data, 2026)

As shown in Table 4.2, the highest mean score of 3.70 with SD 0.84 is recorded by Analytics-Enabled Perceived Usability (PU. This indicates that because of CBE's proper use of data, customers have high faith on the mobile banking app and confirms the app has intuitive, user freindly and effortless interface that customers acknowledged. Following this Analytics-Enabled Perceived Responsiveness (PR) recorded 3.53 mean (SD = 0.77). this result shows customers perceive the mobile app as responsive and reliable in issue resolution and system response.

Analytics-Enabled Perceived Security (PS) registered a moderate to high mean score 3.35 with a standard deviation of 0.87. It shows customers feel secured in their current transaction safety and privacy. But CBE can increase its customers trust in the app even more by using analytics driven fraud prevention strategies.

Among all the independent variables Analytics-Enabled Perceived Personalization (PP) recorded the lowest mean score i.e, 2.99 with highest SD 1.25, which indicates a significant variance in respondent responses. This moderate score and variance of responses implies the difference of experiences from customer to customer in the banks mobile app personalized dashboards and recommendations services. This highlights the bank has an opportunity to improve its service quality using data analytics and give personalized and efficient services for each users.

The dependent variable, Mobile Banking Customer Experience (MBCX), registered a high mean score of 3.77 with a standard deviation of 0.92. This strong mean suggests CBE's mobile app users experience is highly positive and seamless because of the integration of analytics enabled service quality dimensions. This satisfying and excellent service is a foundation for retention.

4.3 Correlation Analysis

Correlation analysis is a statistical method used to examine the strength and direction of the relationship between two or more variables. This applies this method to identify the correlation between analytics enabled service quality dimensions and the mobile banking customer experience. To quantitatively measure these relationships, the Pearson Correlation Coefficient (r) was employed, with results ranging from -1.0 to +1.0. Accordingly, +1 indicates a perfect positive relationship, -1 indicates a perfect negative relationship, and 0 indicates the absence of any relationship.

To interpret the strength of these relationships, this study is conducted in line with the widely accepted guidelines proposed by Cohen (1988). According to these guidelines, a correlation coefficient (r) between 0.10–0.29 is considered weak, 0.30–0.49 is moderate, and 0.50–1.00 is considered a strong relationship. By employing these measures, it becomes possible to examine how usability, responsiveness, personalization, and security on customer experience. This contributes the Commercial Bank of Ethiopia with valuable insights to further improve its mobile banking services.

Table 4. 3 *Correlation between Service Quality and Mobile Banking Customer Experience*

Correlations						
		PU	**PR**	**PP**	**PS**	**MBCX**
PU	*Pearson Correlation*	1	.579**	.469**	.630**	.787**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	378	378	378	378	378
PR	*Pearson Correlation*	.579**	1	.420**	.505**	.550**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	378	378	378	378	378
PP	*Pearson Correlation*	.469**	.420**	1	.666**	.444**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	378	378	378	378	378
PS	*Pearson Correlation*	.630**	.505**	.666**	1	.679**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	378	378	378	378	378
MBCX	*Pearson Correlation*	.787**	.550**	.444**	.679**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	378	378	378	378	378
**. Correlation is significant at the 0.01 level (2-tailed).						

Source; (Survey Data, 2026)

As can be seen from the Pearson Correlation results in Table 4.3, the relationships between all independent variables and the dependent variable Mobile Banking Customer Experience (MBCX) are confirmed to be statistically significant ($p < 0.01$) and positive.

The dependent variable (MBCX) most strongly correlated with perceived usefulness (PU), which had a coefficient of 0.787. This suggests that when users find the application more useful, their digital banking experience tends to improve as well. Likewise, a strong positive correlation 0.679 was observed between perceived security (PS) customer experiences, suggesting that security measures significantly enhance the overall experience.

In addition, the correlation between Perceived Responsiveness (PR) and customer experience was registered a value of 0.550. This is classified as a strong positive correlation, confirming that the application's prompt responsiveness makes a strong positive contribution to enhancing customer experience.

In contrast, Perceived Personalization (PP) showed a correlation of 0.444 with customer experience, indicating the weakest positive correlation among the variables. Although the relationship is positive, the result suggests that the influence of personalization on customer experience is moderate and less significant compared to the impacts of usefulness and security.

In general, the findings show that a close relationship between digital banking services dimensions and customer experience, particularly highlighting usefulness as the most important driver.

4.4 Regression Assumption Tests

4.4.1 Normality Test

To examine the data distribution of the study, a Normal P-P Plot analysis was conducted. The graph is used to evaluate whether the residuals in the study are normally distributed.

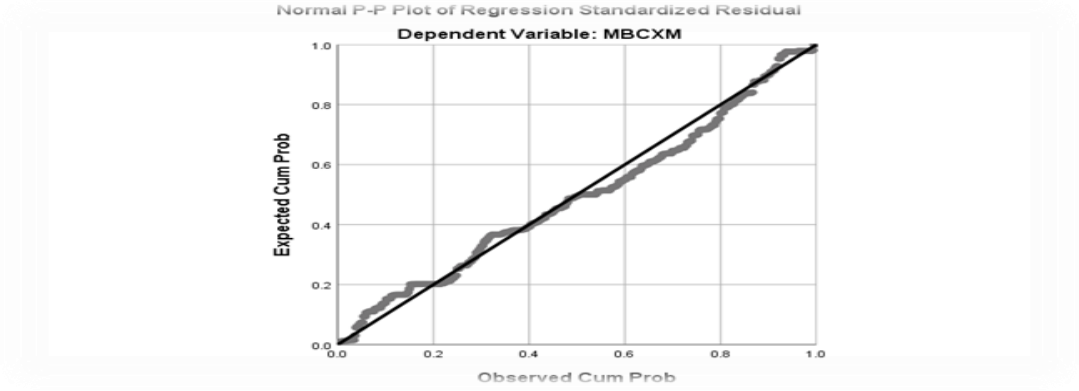


Figure 4. 1 *Normality P-P Plot or Regression Standardize Residual*

Source; (Survey Data, 2026)

As presented in the Normal P-P Plot above, the observed cumulative probabilities closely follow the diagonal line representing the expected cumulative probabilities. As the points do not show substantial deviation from the line, the data is considered normally distributed. This confirms that the chosen regression model is appropriate, and that the data can be reliably used for further analysis.

In addition, the researcher observed the distribution of residuals using a Histogram of Regression Standardized Residuals. As shown in the histogram below for the 378 samples, the data

distribution peaks at the center and tapers off symmetrically in both directions. The presence of this bell-shaped curve indicates that the residuals satisfy the requirements for normality.

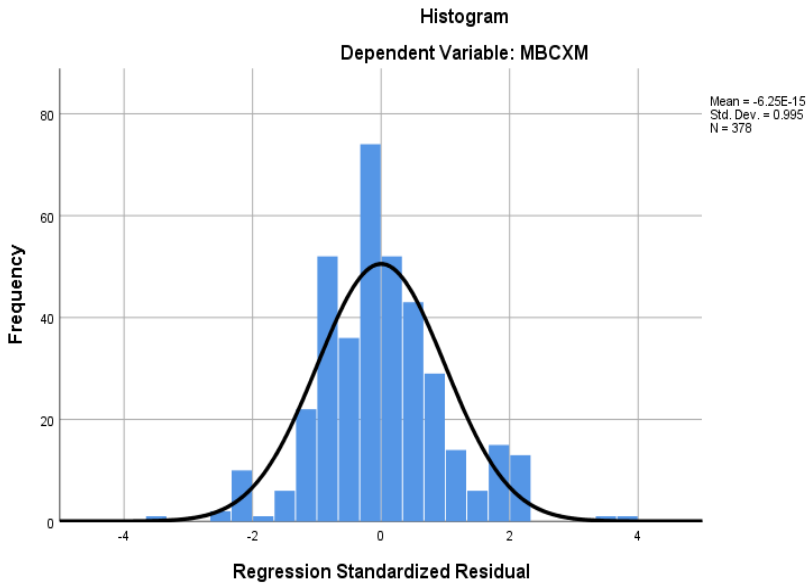


Figure 4. 2 *Normality Tests-Histogram Regression Standardize Residual*

Source; (Survey Data, 2026)

In general, the normality test findings demonstrate that the regression analysis is based on a properly distributed dataset. This confirms a reliable foundation for proceeding with the subsequent interpretation of the regression findings.

4.4.2 Linearity Test

A linearity test was conducted to verify that the relationship between the independent variables and the dependent variable is linear. Accordingly, the test result indicates that the assumption is satisfied and supporting the appropriateness of the linear regression model used in the study.

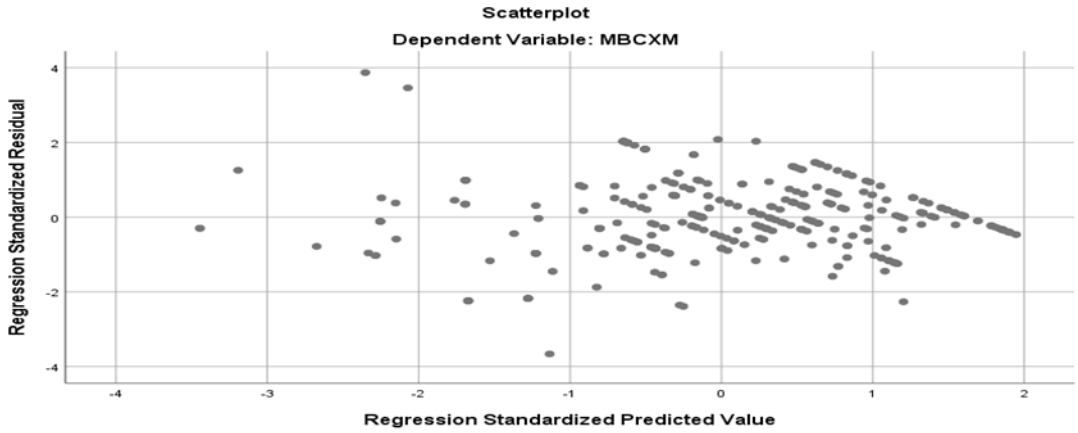


Figure 4. 3 Linearity Regression Standardized Predicted Value

Source; (Survey Data, 2026)

As demonstrated in the scatter plot above, the data points are randomly dispersed around the zero (0) line without forming any distinct shape. This confirms a linear relationship between the independent and dependent variables, indicating that the assumption of linearity has been met.

4.4.3 Homoscedasticity Test

One of the key requirements for a regression model to produce reliable results is that the assumption of homoscedasticity is satisfied. This test is used to confirm that the residuals exhibit constant variance across all values of the independent variables.

As shown in Figure 4.3 above, the data points are dispersed randomly around the zero line, showing no distinct pattern such as fan-shaped. The fact that the spread of the points remains consistent from the beginning to the end of the graph confirms that the assumption of homoscedasticity has been satisfied. This implies that the regression results are not influenced by data variations in the data, supporting their use for valid conclusion.

4.4.4 Multicollinearity Test

Multicollinearity refers to a situation in which two or more independent variables in a regression model exhibit a high degree of correlation. If this condition is present among the service quality dimensions of commercial bank of Ethiopia's mobile banking service, it makes it difficult to separately evaluate the effect of each dimension on the dependent variable (Customer

Experience). To examine this concern, Tolerance and Variance Inflation Factor (VIF) metrics were primarily used.

According to general statistical guidelines, the VIF value should be less than 10 to confirm that the variables are not highly multi-collinear. A VIF value exceeding this threshold indicates a significant overlap between variables, which calls into question the stability and accuracy of the regression results, specifically the B and Beta coefficients.

Table 4. 4 *Multicollinearity*

Model		Collinearity Statistics	
		Tolerance	***VIF***
	PU	.511	1.957
	PR	.625	1.599
	PP	.546	1.831
	PS	.419	2.384

Source; (Survey Data, 2026)

As presented in the Collinearity Statistics in Table 4.4, the Variance Inflation Factor (VIF) values for all independent variables lie between 1.59 and 2.38. In addition, the tolerance values are relatively high, indicating that they are above the acceptable minimum level.

In general, VIF values below 10 and the tolerance value are above the minimum acceptable value 0.1) indicates that multicollinearity is not a concern in this study. These finding shows that the regression results are stable and that the independent variables do not strongly overlap, making it possible to evaluate each variable's individual effect on the outcome variable.

4.5 Regression Analysis

To assess the relationship, a multiple linear regression analysis was performed between the four analytics enabled dimensions (PU, PR, PP and PS) and the mobile banking customer experience (CX) of the commercial bank of Ethiopia.

Table 4. 5 *Model Summary*

Model Summary[b]				
Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*
1	.826[a]	.682	.679	.52050
a. Predictors: (Constant), PS, PR, PU, PP				
b. Dependent Variable: MBCX				

Source; (Survey Data, 2026)

As can be seen from the model summary in Table 4.5, the recorded (R) value of 0.826 reflects strong and positive relationships between the independent variables (PU, PR, PP, PS) and the dependent variable (MBCX).

In addition, the result of R^2 value of 0.682 suggests that only about 68.2% of the variance in the mobile banking customer experience (MBCX) can be explained by the independent variables considered. The remaining 31.8% is influenced by other unobserved factors. Attributed to external variables not captured in the model.

The small gap between R^2 (0.682) and the adjusted R^2 (0.679) with only a small difference of (0.3) suggested that the model has strong predictive capability and is likely generalizable, indicating that the results are not heavily influenced by sample size.

Table 4. 6 *ANOVA*

ANOVA[a]						
Model		*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
1	Regression	216.725	4	54.181	199.987	.000[b]
	Residual	101.055	373	.271		
	Total	317.779	377			
a. Dependent Variable: MBCX						
b. Predictors: (Constant), PS, PR, PU, PP						

Source; (Survey Data, 2026)

As shown in the ANOVA results in Table 4.6, The F- statistic was recorded at 199.987 with significance level (P-value) of 0.000, indicating that the overall model is highly statistically significant. This finding confirms that the independent variables (PU, PR, PP, and PS) have a

significant impact on mobile banking experience (MBCX), rather than the outcome occurring by chance.

In addition, the regression sum of squares (216.725), is notably higher than the residual sum of squares (101.055), showing that the model has a strong explanatory power for variance of customer experience.

In general, the ANOVA findings indicate that the regression model is an appropriate and adequately explains the relationship between service quality dimensions and customer experience.

Table 4. 7 *Coefficient of Variables*

Model		*Unstandardized Coefficients*		*Standardized Coefficients*	*t*	*Sig.*
		B	*Std. Error*	*Beta*		
1	(Constant)	.128	.141		.907	.365
	PU	.612	.044	.562	13.769	.000
	PR	.107	.044	.089	2.423	.016
	PP	-.057	.029	-.078	-1.966	.050
	PS	.348	.047	.331	7.350	.000

Source; (Survey Data, 2026)

Using the regression coefficient provided in table 4.7, a mathematical model can be formulated to capture the relationship between the independent and dependent (MBCX) variables;

$$BL = B0 + B1X1 + B2X2 + B3X3 + B4X4 + \varepsilon$$

Detailed Formula Description

BL = Mobile Banking Customer Experience (MBCX)

B0= Constant/Intercept

X1, X2, X3, and X4 represent Perceived Usability, Perceived Responsiveness, Perceived Personalization and Perceived Security respectively

B1, B2, B3, B4= Regression Coefficients

ε = Error term

Based on the Unstandardized Beta (B) coefficients obtained from the study, the specific regression equation for this research is defined as follows

MBCX = 0.128 + 0.612(PU) + 0.107(PR) - 0.057(PP) + 0.348(PS) + ε

The regression equation demonstrates that Analytics-Enabled Perceived Usefulness (PU), Perceived Security (PS), and Perceived Responsiveness (PR) play significant positive roles in shaping customer experience. In contrast, Perceived Personalization (PP) shows a marginal and statistically negligible negative effect.

4.6 Hypothesis Testing

H1: **Analytics-Enabled Perceived Usability** has a positive and significant effect on mobile banking customer experience. **(Supported)**

This variable carries the highest positive impact ($\beta = 0.562$, $p < 0.01$). This strong statistical significance suggests that the bank's application of analytics in making service simpler, more efficient, and reduce error, significantly influences customer experience. This suggests that by understanding user behavior and streaming tasks, the application acts as a primary factor in improving the overall customer experience.

H2: **Analytics-Enabled Perceived Responsiveness** has a positive and significant effect on mobile banking customer experience. **(Supported)**

The analysis confirms that this variable contributes positively and significantly to the outcome ($\beta = 0.089$, $p = 0.016$). With a P-value below 0.05, the result suggests that the bank's use of operational data to provide timely and proactive updates, including advance notifications of system downtime, significantly enhances customer experience.

H3: **Analytics-Enabled Perceived Personalization** has a positive and significant effect on mobile banking customer experience. **(Not Supported)**

The impact of this variable was found to be insignificant ($\beta = -0.078$, $p = 0.050$). Despite the slightly negative coefficient, the P-value of 0.050 indicates that the variable does not have a statistically significant impact. The finding indicates that existing customization features may not be fully developed or effectively recognized by customers, leading to a minimal influence on overall experience.

H4: **Analytics-Enabled Perceived Security** has a positive and significant effect on mobile banking customer experience. **(Supported)**

The finding indicates that, security was found to be the second most influential positive factor ($\beta = 0.331$, $p < 0.01$). This implies that employing data analytics for real time fraud detection and security risk mitigation substantially enhances digital trust while positively improving customer experience.

In general, the findings indicate that improving mobile banking customer experience requires the commercial bank of Ethiopia to focus primarily on enhancing analytics enabled perceived usability and security measures.

4.7 Analysis of Open-Ended Questions

At the conclusion of the survey, there were 4 open ended questions aiming to allow respondents, give their detailed observation, experience, risk and future recommendations about CBE's mobile banking services. This is done to collect qualitative insights that can't be expressed through numbers and to understand in detail the customers' actual needs.

Out of the total 378 participants 184 (48.7%) give their comments in all the open ended questions. The responses are interpreted by grouping the same ideas in a theme.This qualitative analysis helps to strengthen previously obtained statistical results through a triangulation method. This show the study findings are supported by customers' actual experience and narratives. Accordingly, respondents' general comments for the 4 questions are summarized and presented as follows:

Question 1. What do you like most about CBE mobile banking?

Respondents provided feedback about the positive perceptions and specific services they like most. The responses show high customer satisfaction and are categorized in themes as follows:

Most of the respondents discussed the convenience and time saving benefit of the service. As many of the responses show the apps 7/24 availability, reduces the necessity of visiting bank branches in person. This is confirmed by key phrases such as "It reduces the time taken to go to the bank," "Being able to pay anywhere and at any time," and "It is time-saving."

Additionally, the speed and efficiency of the application is clearly shown as the second theme. Customers explained the observed efficiency during fund transfers and bill payments, have a

significant impact for their experience improvement. comments like "Fast and efficient," "Instant money transfer," and "Network speed" reflected customers desire for fast transfer, bank's real time data processing and its capacity in processing complex financial data.

Moreover, the app's ease of use and interface clarity were praised. As the responses shown the app is user friendly for both tech-savvy and beginners. This is confirmed by "Easy to use," "Simple and user-friendly interface," and "Simple and comfortable" comments.

Finally, the integration of various services especially, utility payments with apps highlighted as a great benefit. This indicates the banks ability of data integration which comes from various utility providers and delivery of all in one service to users.

In summary, qualitative analysis results show the service is acceptable based on its accessibility, speed and simplicity. These findings directly aligned and reinforced with perceived usability quantitative results that are confirmed earlier in this study.

Question 2. What are the top three improvements you would suggest for CBE mobile banking?

Respondents pointed out key areas that CBE needs to further update and improve in its mobile banking services. These suggestions are categorized into the following themes:

Network and system reliability has been found to be the most frequently mentioned and improvement requiring aspect. Customers suggest the bank to resolve repeated system downtime especially in peak hours. This indicates that customers have high interest in getting a service without network interruption. Also, this advises the bank to improve its predictive maintenance analytics to predict and prevent system malfunctions before they happen.

Additionally, there was a high demand on options that allowed them to use the app without using data or Data free access. Respondents give beneficiary suggestions about error messages sent when there is a system crash. Instead of generic messages like "technical error", they requested a detailed explanation of the errors. This helps to reduce customers' frustration due to lack of information clarity.

Modernizing security and authentication are shown as another major customer's concern. They asked to include additional biometric features like Fingerprint, Face ID and also easy forgot password recovery. This means CBE has to implement identity analytics to confirm its customer's identity digitally. By doing this CBE can enhance security and ease of use together. Responses like "Fingerprint lock system" and "security enhancement" implies customers give a high value for their digital security.

Another respondents raised limitation is about account statements. Many customers identified as a big weakness their inability to see six months and above transfer history. This interest to get long time records indicates CBE has to establish analytical systems that organize and deliver historical big data to users. Including new service features is another widely discussed improvement area. Respondents expressed their interest on some services, such as international remittances, additional utility bill payment options and integration of visa card services, to be included in the application. Finally, there was a high demand on in-app customer support Chatbot. Suggestions were given to include AI and analytics powered assistants, which indicates CBE has to use predictive analytics to proactively understand and meet its customer needs.

The above qualitative suggesions from users explain clearly and triangulate the findings from quantitative analysis. Users value service ease of use, thereby Analytics-Enabled Perceived Usability (PU) found as the primary driver of customer experience (beta= 0.562, $p < 0.01$) in the model. Service needs like data free access, service improvements and a clear error message determines customers trust on the bank. In relation to this the high demand for biometric logins and fingerprint shows customers priority for safety. Which made Perceived Security (PS) as the second core driver of MBCX (beta= 0.331, $p < 0.01$).

Further, customers' complains about peak hour downtimes and requests on stable network and Chatbots. This reflects the relevance of improving Perceived Responsiveness (PR) (beta= 0.089, $p = 0.016$). The current customers' interest and banks focus is on app functionality, system upgrades and service expansion. So the bank's effort on tailored individual services is low. Thus, the quantitative study result of Perceived Personalization (PP) yields negative effect (beta = -0.078). Overall as per the findings to enhance its digital services and customer experience, CBE must based on and integrate technological changes and the empirical drivers.

Question 3. Have you experienced any security or privacy concerns while using the app? If yes, please describe?

Even though most of them say they have not encountered any security problems, some customers stated the issues they have faced. These issues are categorized into the following themes:

Phishing and hacking issues are significantly mentioned. Some customers mentioned attempts like telegram hacking, phishing attacks and efforts by unauthorized people to open accounts using other phone numbers. Responses about phishing attack and telegram hacks indicate customers feel exposed to 3rd party frauds that are out of control of the bank. This implies beyond the usual safety procedures, CBE has to improve fraud detection analytics that help to detect and prevent unusual financial services.

Technical issues related to one time password (OTP) and password confidentiality were identified. Customers stated risks such as sometimes there is a delay in OTP messages and their visibility to others. This suggests the bank needs to modernize the authentication process. To strengthen digital trust rather than being dependent on OTP, deploying risk based authentication based on usage habit and location is required.

Another issues transaction reversal delays are stated as a risk. Respondents mentioned during unsuccessful fund transfers the amount is deducted from their account but there are times in which the money is not refunded immediately.

Also customers pointed out their uncertainty on unauthorized fund transfers during mobile phone theft or loss. To solve this risk CBE has to introduce behavioral analytics driven security. This helps the app to automatically lock by itself when unusual activity.

The overall qualitative suggestions from customers, gives important information that makes the findings confirmed and real from quantitative regression analysis. Although they enhance the study reliability by aligning the statistical result with real customer experience. As discussed earlier, in the empirical model Perceived Security (PS) is shown as the second highly significant predictor of CX (beta= 0.331, $p < 0.01$). This is also discussed through the qualitative suggestions such as fears regarding phishing, hacking, transaction reversal delays and phone

theft. The qualitative data indicates users are highly cautious regarding risks. The key factors that determine their overall experience are data protection and operational trust.

Also delayed OTP delivery and technical transparency are main resasons that increases customers' risk. These problems are directly related to PR (beta = 0.089, p = 0.016). From this we can understand customers security risks worsen by slow system feedback. Although most of the customers have trust in the system's integrity, the mentioned various risks indicate CBE must go beyond Digital security awareness creation. Also the findings indicated to ensure users security, implementing proactive analytics enabled defence mechanisms is essential.

Question 4. Any other comments about your mobile banking experience with CBE:

In the final section respondents were invited to give additional comments about overall experience on CBE's mobile banking. The responses show the strength of the bank and also give strategic directions for future improvement.

Many participants expressed their satisfaction on the service by saying "Makes life easier and accessible", "very good and reliable application" and "my constant preference" and the like. They also encouraged the ongoing technology transitions which have a big impact on strengthening their trust. It also suggests the bank's investment in data driven digital transformation is increasing its credibility.

Further participants suggested the technical parts that need improvement. These include QR Code and Merchant Payment services. CBE is currently providing QR Code and Merchant Payment features. But users gives there feedback on these services to be more reliable and expand widely in local merchants. Additional suggestions include considering the app size for users with limited device storage (light version), availability in more local languages and account statements for more than 6 months and the like.

Another strong suggestion was given about, clear instruction guides or videos to be prepared for customers with limited technology skills which help them reduce risk of fraud. This indicates CBE is expected to provide inclusive services. To do so CBE has to implement User segmentation analytics to identify which demographic group needs additional support and provide tailored educational resources.

Customers positive comments about the app and requests related to service exapnsions like QR codes, merchant payments, local languages, and a lighter app version, implies clearly Analytics Enabled PU (beta= 0.562, $p < 0.01$), is the primary determinant of customer experience. Also they magnify improving the app's ease of use is the best digital strategy for the bank. Comments like clear instruction guides and educational videos for low technology skilled users show the significance of Perceived Security (beta = 0.331, $p < 0.01$) in the statistical result and the customers' confidence is built on risk mitigation and awareness creation.

According to the overall qualitative findings from all four open ended questions, it can be concluded that CBE mobile banking has a highly positive acceptance by users overall. However, CBE's digital strategy has to be focused mainly on the advancement of perceived usability, security and responsiveness. This helps to enhance the overall customer experience. Also the study results indicate where to focus the bank's capacity building investment. The absence of customers requests about personalization in all four questions implies why the quantitative analysis result of personalization yield negative impact in the model. This indicates users give priority to security and usability more than personalization in their current mobile banking services.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary/Discussion of Findings

In line with the objectives set out in Chapter One, the primary objective of this study was to investigate the impact of analytics enabled service quality dimensions on the customer experience (CX) of CBE mobile banking users. Data was collected from 378 respondents, the majority of whom are highly educated (64% hold a degree or higher) and are long-term users with over four years of experience with the service. This indicates that the data was obtained from active users who possess high digital literacy and an intimate knowledge of the bank's services.

Descriptive statistics reveal that while customers positively perceive the application's Usability, Security, and Responsiveness, they hold a lower opinion of its Personalization. The regression analysis shows that these variables explain 68.2% (R^2 = 0.682) of the variance in customer experience. The implications of these results, compared with existing literature, are discussed below:

Analytics-Enabled Perceived Usability

The study confirms that analytics enabled perceived usability is the most significant and primary driver of customer experience for CBE mobile banking users. The findings show a very strong correlation between perceived usability and MBCX (r = 0.787), and the regression results (*B* = 0.562) verify that this dimension leads in increasing customer satisfaction and loyalty. This aligns with the Technology Acceptance Model (TAM) introduced by Davis (1989) and further developed by Alalwan et al. (2016), along with findings from Srivastava & Vishnani (2021) and Johannes et al. (2018), which highlight ease of use as a critical driver of customer experience. The results further indicate that users value the application’s capacity to simplify processes through data-driven features, supporting Ayinaddis et al. (2023) on the importance of functional efficiency within CBE’s digital banking platforms.

Understanding of usability is the main finding of this study. Traditionally, it is been taught through TAM frameworks to view usability as a fixed set of design principles but the study

shows it is more dynamic. It is about how it uses data to shift and respond to the way people are actually using it. In areas like Ethiopia which has unique infrastructure challenges, this type of predictive and data driven usability can bridge the gap caused by unstable network. That means the app's every day benefit and simplicity compensate users network delay frustrations.

These statistical results are confirmed clearly from the open ended questions feedback. Users show the reason why they remian loyal to the app by highlighting "time-saving" and "extreme ease of use". These responses indicate users seen the app not only as a basic transactional tool rather they view as a valuable asset in their daily routine which eliminate the traditional banking stress through its intellignet features.

Analytics-Enabled Perceived Responsiveness

The findings indicate that analytics enabled perceived responsiveness has a moderate positive relationship with customer experience ($r = 0.550$). The regression results ($\beta = 0.089$) indicates a statistically significant. This implies that features such as automated notifications, real-time updates, and quick system responses help improve the overall banking experience. In particular, proactive messaging and real-time fraud alerts appear to enhance users' perception of responsiveness.

However, results from the open ended responses indicated that the overall influence of responsiveness is somewhat limited when compared to usability and security. This is mainly due to system downtime and network-related issues. While this findings aligns with prior studies (Khan.et al., 2018; Ojiaku et al., 2023), the Ethiopian context shows that technical interruptions can weaken the role of responsiveness.

The study brings a new perspective of responsivenss. In developing country like Ethiopia the responsiveness concept is highly depend on the acutal infrastructure challenges. Previous studies assumed that automated alerts and features guarantee customers happiness, but this study show a different reality that the app responsiveness is less powerful because of network problems and system downtime.

This finding suggests banks that are in a poor infrastructure to change their usage of data analytics. Rather than focusing on sending notifications after transactions or being reacitve, they

need to start a predictive strategy. This can help them to predict potential system failures early and maintain trust by protecting the users experience from downtime frustrations.

Analytics-Enabled Perceived Personalization

The findings reveal that analytics enabled perceived personalization, despite showing a moderate correlation with customer experience (r = 0.444), has a negative and statistically insignificant effect in the regression model (β= -0.078). The low mean score further suggests that users do not perceive CBE's mobile banking app as offering meaningful personalized services.

This result contrasts with prior studies (Mostafa, 2020; De Leon et al., 2020), which highlight personalaization as key driver of customer satisfaction. Alikely explanation is that analytics-driven personalization is still at an early stage. In addition, the negative coefficient may reflect underlying privacy concerns, as customers can perceive data-driven monitoring as intrusive when clear benefits are not evident.

Universally personalization is beneficial but this study findings challenge this assumption in the Ethiopian context. In a country that has not yet fully matured in app features and network connectivity, advanced customization features can make the CX progress difficult. Also it magnifies 'privacy paradox'. When customizing the app services using user data tracking, users feel uncomfortable. They don't view it as a service enahncement rather they perceived it as an intrusion. so this indicates digital trust must come first before personalization.

Analytics-Enabled Perceived Security

The examined data indicates that analytics enabled perceived security is the second most powerful factor of customer experience. A clear correlation (r = 0.679), combined with regression results (β= 0.331) proves that this factor has a heavy, consistent impact. Essentially, when customers feel the bank is using analytics for real-time fraud detection and data protection, their trust in the app and their overall experience improve. Because moving money digitally creates a natural sense of anxiety, the bank's use of data-driven security is vital for maintaining user confidence. These results sit in full agreement with Chang and Chen (2009) and Almaiah et al. (2023), who suggests that the perception of security is the real foundation of trust in mobile

banking. However, qualitative feedback regarding phishing and external hacking suggests the bank must push its analytics further to educate its users.

This study shifted the understanding of banking security as a passive concept to a new active perspective. Passwords or encryptions are no longer mainly determines users trust. Today, users' confidence grows when they see the bank is actively monitoring threats and mitigating frauds as it happens. Meaning they start to evaluate bank's security position by its responsiveness. Beyond previous studies focused on technical tools, this study explores a human aspect in the Ethipian banking context. Even in the stong backend protection, customers still feel and report their fear because of phone scams and phishing. This implies banks should shift their internal system protection to outward. So they need to use data analytics outward to support and protect their exposed customers by analyzing their behaviors and creating delivering personalized security awareness programs.

5.2 Conclusion

Based on the analysis findings presented in Chapter Four, this study provides the following conclusions regarding the analytics-enabled service quality and customer experience of CBE mobile banking:

- The study concludes that Analytics-Enabled Usability, Security, and Responsiveness are positively received by customers. The application is confirmed to be a time-saving, efficent, and user friendly tool. On the other hand, analytics-enabled personalization demonstrates limited effectiveness, indicating that the bank is still not making full use of customer transaction data to offer customized financial insight.
- Finding from qualitative data suggests that ,although overall satisfaction is high,the study concludes that mobile banking experience is still has issues such as frequent system downtime, network congestion, and third-party fishing or hacking attempts (via Telegram malicious links)
- The findings indicate a positive and significant relationship between all analytics enabled dimensions and customer experience. More specifically, usability, responsiveness, and security are found to have an extremely strong correlation, while personalization shows a moderate relationship with the overall experience.

- The regression analysis indicates that analytics enabled usability and security are the key dimensions with significant positive predictive impact on customer experience.Similarly, responsiveness shows a meaningful positive contribution to predictive outcomes.
- Most significantly, the findigs indicate that analytics enabled personalization does not show significant predictive power. Since personalized financial advice, alerts, and customized dashboards are not yet practically accessible, their impact on customer experience remains low. This clear service gap is identified because of the early stages of data driven personalization at CBE. Also the negative result of this variable indicates users' percieve data monitoring as an intrusive practice rather than value adding service unless it is gives clear and immediate benefits to them. So in the absence of transparency, customers view it as personal data violation than their convenience tool.
- Finally, the study concludes the strong applicability of the SOR-CX model in the Ethiopean banking context. It indicates that analytics enabled features serve as a key stimulus that positively affects the customer's psychological state, ultimately producing a favorable response such as trust and positive experience.

5.3 Recommendations

Based on the quantitative findings, qualitative feedback and the overall conclusion of this study, the following strategic and operational recommendations are suggested for the commercial bank of Ethiopia (CBE) and other relevant stakeholders in the digital banking sector.

Recommendations for the Commercial Bank of Ethiopia (CBE)

1. Enhancing Analytics-Enabled Perceived Usability (The Strongest Driver)
   - In order to make the application to be more user friendly, it is important for CBE to continuously adopt data analytics. Because, it will help the bank to understand usability experience of its customers.
   - The bank needs to add voice-assisted and autocomplete features in its mobile banking application system. These features imply the different service option and attract all types of customers.

- Hence all types of daily business transactions are becoming fully transformed to digital payment systems in the country, CBE needs to continuously update and integrate its existing QR code and merchant payment features.
- Because CBE has a national boundary customer base, it is mandatory to expand the language base for customer satisfaction.
- To ensure broader digital inclusion, there needs to develop a light-version application systems, which allows to be used by older version mobile devices.

2. Modernizing Analytics-Enabled Perceived Security (The Second Strongest Driver)
   - Besides the existing OTPs, it is important to add Fingerprint and Face ID security features to boost customers' confidence on safety matters.
   - In order to prevent digital theft or Hacking and protect customers' account safe, the bank should deploy a system that can prevent login trial errors and suspicious transactions automatically.
   - By sending regular communication messages, CBE should continuously educate its customers about the mobile banking application system updates, safety and suspicious happening current hacking situations.
3. Improving Analytics-Enabled Perceived Responsiveness (The Third Driver)
   - In order to maximize customer satisfaction, CBE should integrate an AI-Powered chatbot. This will provide 24/7 instant response and solution to customer's inquiries
   - To ensure smooth performance, CBE should apply predictive analytics monitoring system. This will help to identify possible server overloads in advance and give a solution.
   - During the time of maintenance, CBE should send early notifications to its customers ahead of days. This will warn customers to be aware of system interruption and avoid compliance
   - During the time of system failure, instead of generic messages CBE should send automatic notifications that explain the situation clearly and reduce resolution steps. This will minimize customers' anxiety.
   - At the time of failed transactions, the system should automatically perform the customer's balance reconciliation. This will boost customers' confidence about the application's reliability.

4. Strategic Approach to Perceived Personalization (Statistically Insignificant)
   - It is recommended that CBE should primarily focus on strengthen the easiness of the application and its safety. Because personalization currently is not a priority by customers. It should not rush to transform its basic payment app into a highly customized financial platform.
   - It is recommended that if CBE would like to introduce customized financial tools in the future, such as financial guidance and expenditure monitoring, then it is important to get customers' acceptance in safety and data privacy.
5. Operational Data and Partnership Adjustments (Qualitative Demand)
   - To meet growing customers demand to generate and download bank statement beyond six months by their mobile application, CBE should expand its digital storage capacity.
   - To improve wide range mobile banking accessibility and encourage customers to use the system frequently, CBE should negotiate partnership with telecom providers (Ethio Telecom and Safaricom) to offer data free access for basic mobile banking services such as balance inquiry.

Recommendations for Ecosystem Stakeholders

- For Telecommunication Providers (Ethio Telecom/Safaricom): In order to minimize network congestion, telecommunication network providers must establish stable high priority bandwidth for the financial sector. Besides, they should collaborate with CBE to facilitate the Data-free access requested by mobile banking users.
- For the Regulatory Body (National Bank of Ethiopia-NBE): As a main financial regulatory body, it is mandatory for the NBE to formulate and enforce strict Data privacy and protection guidelines specific to digital banking analytics.
- For Digital Banking Customers: Customers should practice basic data protection steps like regularly updating their mobile banking app, activating biometric security features and ignoring unofficial third-party links.

5.4 Suggestions for Future Research

While the study provides meaningful insights into the research questions, it also identifies certain limitations and areas that require deeper exploration. Considering the complexity and evolving nature of service quality and customer experience, the following points are recommended for future research;

- Given that this study centered on the Commercial Bank of Ethiopia (CBE), future studies are encouraged to include other private banks for comparison, which would provide a broader perspective on digital banking in the country.
- To enhance understanding, future researchers could explore additional or different variables when examining the relationship between data analytics and customer experience.
- As this research primarily relied on quantitative methods, future studies are encouraged to apply qualitative techniques, such as in-depth interviews, to gain deeper insight into customers' emotional responses and perceptions.
- The study was limited to the customers' viewpoint. Future studies are encouraged to integrate the perspectives of technical staff and management to gain a deeper understanding of service quality from internal operational and technological angles.
- This study was limited to customers residing in Addis Ababa. It is therefore advisable to consider future research to include regional and rural areas to gain a more comprehensive understanding of digital banking accessibility and the variation in customer experiences across locations.
- It is recommended for future studies to adopt the full Stimulus-Organism-Response (SOR) framework sequential by building up on this study findings. By using Structural Equation Modeling (SEM), future researchers can futher study by considering MBCX as a mediating variable that connects analytics enabled service quality dimensions (Stimuli) and various behavioral outcomes (Response).

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ANNEX: QUESTIONNAIRE

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

DEPARTMENT OF MASTERS OF DIGITAL MARKETING AND E-COMMERCE

Questionnaire to be filled by CBE customers

Dear Survey Respondents,

My name is Eyerusalem Haile, MSC student at Addis Ababa University School of Commerce. I am conducting a research project entitled " The Effect of Analytics-Enabled Service Quality on Mobile Banking Customer Experience: Evidence from the Commercial Bank of Ethiopia'' Your involvement is regarded as a great input to the quality of the research results. The soundness and the validity of the findings highly depend on your genuine responses. Hence, your honest and thoughtful response is invaluable. I would like to assure you that the information you provide will be used only for academic purpose and kept confidential.

Instructions:-

- ✓ No need of writing your name.
- ✓ Put a checkmark (√) in the box corresponding to your answer.

For any problem and suggestion contact the researcher through the following addresses:

Phone: +251912498074

Thank you for your participation and for taking the time to assist me in my educational endeavours.

(Adapted from Arcand 2017, Mostafa 2020, Zhou 2021, Palamidovska 2025, Ayinaddis 2023)

Part I: Questions related with Background Information

1. Gender: A. Male ☐ B. Female ☐
2. Age:

A. 18–24 ☐ B. 25–34 ☐ C. 35–44 ☐ D. 45–54 ☐ E. 55 or above ☐

3. Education Level:

A. No formal education ☐

B. Primary school completed ☐

C. Secondary school completed ☐

D. College diploma/degree ☐

E. Master's degree or above ☐

4. Occupation:

A. Student ☐

B. Employed (public sector) ☐

C. Employed (private sector) ☐

D. Self-employed/business owner ☐

E. Unemployed/other ☐

5. How long have you been using CBE's mobile banking services?

A. Less than 6 months ☐ B. 6–12 months ☐ C. 1–2 years☐ D. 2-4 years ☐

E. More than 4 years ☐

6. How often do you use CBE's mobile banking app?

A. Daily ☐ B. Weekly ☐ C. Monthly ☐ D. Rarely ☐

7. Which types of transactions do you most frequently perform via mobile banking? (Select all that apply)

☐ Balance inquiry ☐ Fund transfer ☐ Bill payment ☐ Airtime top-up ☐ Account management ☐ All

8. Have you ever contacted CBE customer support regarding mobile banking issues?

A. Yes ☐ B. No ☐

If yes, how satisfied were you with the support?

A. Very Dissatisfied ☐B. Dissatisfied ☐C. Neutral ☐D. Satisfied ☐E. Very Satisfied ☐F. Not Applicable ☐

Part II: Mobile Banking Service Quality

Please indicate your level of agreement with the following statements about CBE's mobile banking app.

Measuring scales representation:

(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

No	Service Quality Dimensions	Rating Scales				
		1	2	3	4	5
	Analytics Enabled Perceived Usability					
1	The mobile banking app adapts to my usage habits, making it consistently easy to use.					
2	The app's interface intelligently organizes menu options based on the services I access most frequently.					
3	By analyzing my previous transactions, the app streamlines the process so I can complete common tasks more quickly.					
4	The modern layout and design of the app simplify my					

	overall transaction experience.					
5	The system proactively detects my input errors and provides smart, helpful guidance to fix them.					
6	The app's intuitive design makes it easy for me to learn and use new features.					
7	The app anticipates my needs (e.g., auto-filling recent account numbers), which reduces the mistakes I make during transactions.					
	Analytics Enabled Perceived Responsiveness					
1	The app provides real-time updates on the status of my transactions and requests.					
2	I receive automated, instant notifications if there are any delays or issues with my banking activity.					
3	The app is adequately capable to process my requests (like statement generation) without significant waiting time.					
4	The app alerts me in advance about system maintenance before it affects my use.					
5	When I encounter a problem, the app's automated support (e.g., smart FAQs or bots) provides immediate and relevant solutions.					
6	The app remains fast and reliable even during the pick usage times.					
	Analytics Enabled Perceived Personalization					
1	The app uses my transaction history to provide financial insights and recommendations tailored specifically to me.					
2	I receive personalized notifications and alerts that are relevant to my spending patterns.					
3	The app's spending history and transaction summaries help me manage my finances more effectively.					
4	The app feels like it knows my banking preferences based					

	on how I have used it in the past.					
5	The banking services and account options suggested to me by the app feel relevant to my financial needs.					
6	The app provides a customized dashboard that highlights the specific data and accounts most important to me.					
	Analytics Enabled Perceived Security					
1	I feel secure knowing the app uses advanced data monitoring to protect my personal and financial information.					
2	The app's advanced login features (such as fingerprint or one-time codes) give me confidence that my data is protected.					
3	I am confident that the bank's real-time monitoring system effectively detects and prevents unauthorized access to my account.					
4	The app provides me with clear confirmations and digital receipts that show my transactions are processed securely.					
5	I have full confidence that the app's security system would quickly find and block any unauthorized transaction.					
6	I value the instant, automated alerts I receive whenever the system detects suspicious activity on my account.					
7	Because of the app's proactive security measures, I feel safe entering sensitive information without hesitation.					
	Overall Mobile Banking Customer Experience					
1	Overall, I am highly satisfied with the smart and modern banking experience provided by CBE.					
2	The app's ability to anticipate my needs and simplify tasks makes my daily banking much easier.					
3	I have high trust in CBE mobile banking because its advanced systems consistently perform my transactions					

	accurately.					
4	My interactions with the app's intelligent features leave me with a very positive impression of CBE's digital innovation.					
5	I am likely to continue using CBE mobile banking because it offers a more personalized experience than other traditional methods.					
6	I would recommend CBE mobile banking to others specifically because of its advanced, user-friendly and secure analytical features.					

Part III: Open Ended Questions

1. What do you like most about CBE mobile banking?

2. What are the top three improvements you would suggest for CBE mobile banking?

_____

_____

_____

3. Have you experienced any security or privacy concerns while using the app? If yes, please describe.

_____

4. Any other comments about your mobile banking experience with CBE:

_____

Thank You!!!

አዲስ አበባ ዩኒቨርሲቲ የንግድ ሥራ ትምህርት ቤት

የዲጂታል ማርኬቲንግ እና ኢ-ኮሜርስ ማስተር ኦፍ ሳይንስ (MSc) ፕሮግራም

ለኢትዮጵያ ንግድ ባንክ ደንበኞች የተዘጋጀ መጠይቅ

ውድ የመጠይቁ ተሳታፊዎች፤

ስሜ እየሩሳሌም ታይሌ ይባላል፣ በአዲስ አበባ ዩኒቨርሲቲ ንግድ ሥራ ትምህርት ቤት የዲጂታል ማርኬቲንግ እና ኢ-ኮሜርስ ማስተርስ ተማሪ ነኝ። በአሁኑ ወቅት "በዳታ ትንተና ላይ የተመሠረተ የአገልግሎት ጥራት እና የሞባይል ባንኪንግ ደንበኞች ተሞክሮ፡ በኢትዮጵያ ንግድ ባንክ ላይ የተደረገ ጥናት" በሚል ርዕስ የምርምር ሥራ እያከናወንኩ እገኛለሁ።

ለጥናቱ ውጤታማነት የእርስዎ ተሳትፎ እጅግ አስፈላጊ እና ትልቅ ግብዓት ነው። የጥናቱ ትክክለኛነት እና አስተማማኝነት ሙሉ በሙሉ የተመሠረተው እርስዎ በሚሰጡት እውነተኛ ምላሽ ላይ ነው። ስለሆነም፣ ለእያንዳንዱ ጥያቄ የሚሰጡት ቅን እና የታሰበበት ምላሽ ለጥናቱ ስኬት ከፍተኛ ዋጋ አለው።

የሚሰጡት ማንኛውም መረጃ ለትምህርታዊ ዓላማ ብቻ የሚውል እና ሚስጥራዊነቱ የተጠበቀ መሆኑን ላረጋግጥልዎ እወዳለሁ።

መመሪያዎች፡-

- **ስምዎን መጥቀስ አያስፈልግም።**
- **ለምርጫዎ ትክክለኛ በሆነው ሳጥን ውስጥ የ "ራይት" (√) ምልክት ያድርጉ።**

ለማንኛውም ጥያቄ ወይም አስተያየት ተመራማሪዋን በሚከተለው አድራሻ ማግኘት ይችላሉ፡-

ስልክ፡- +251912498074

ጊዜዎን ሰውተው ስለተባበሩኝ እና ስለተሳተፉ ከልብ አመሰግናለሁ!

ክፍል ፩፡- አጠቃላይ መረጃ

1. **ጸታ**:

ሀ. ወንድ ☐ ለ. ሴት ☐

2. **ዕድሜ**:

ሀ. ከ18—24 ☐ ለ. ከ25—34 ☐ ሐ. ከ35—44 ☐ መ. ከ45—54 ☐ ሠ. 55 እና ከዚያ በላይ ☐

3. **የትምህርት ደረጃ**:

ሀ. መደበኛ ትምህርት የሌለው/ላት ☐

ለ. የመጀመሪያ ደረጃ ትምህርት ያጠናቀቀ/ች ☐

ሐ. የሁለተኛ ደረጃ ትምህርት ያጠናቀቀ/ች ☐

መ. የኮሌጅ ዲፕሎማ ወይም የመጀመሪያ ዲግሪ ☐

ሠ. የማስተርስ ዲግሪ እና ከዚያ በላይ ☐

4. **የሥራ ሁኔታ**:

ሀ. ተማሪ ☐

ለ. የመንግሥት ሠራተኛ ☐

ሐ. የግል ድርጅት ሠራተኛ ☐

መ. የግል ሥራ/የንግድ ባለቤት ☐

ሠ. ሥራ የሌለው/ሌላት ☐

5. **የኢትዮጵያ ንግድ ባንክ የሞባይል ባንኪንግ አገልግሎትን ለምን ያህል ጊዜ ተጠቅመዋል?**

ሀ. ከ6 ወር በታች ☐ ለ. ከ6-12 ወራት ☐ ሐ. ከ1-2 ዓመታት ☐ መ. ከ2-4 ዓመታት ☐

ሠ. ከ4 ዓመታት በላይ ☐

6. **የንግድ ባንክ የሞባይል ባንኪንግ መተግበሪያን (App) በምን ያህል ጊዜ ልዩነት ይጠቀማሉ?**

ሀ. በየቀኑ ☐ ለ. በየሳምንቱ ☐ ሐ. በየወሩ ☐ መ. አልፎ አልፎ ☐

7. በሞባይል ባንኪንግ በብዛት ምን ዓይነት አገልግሎቶችን ያከናውናሉ? (ከአንድ በላይ መምረጥ ይቻላል)

ሀ. የሂሳብ ቀሪ መረጃ ማወቅ ☐

ለ. ገንዘብ ማስተላለፍ ☐

ሐ. የክፍያ አገልግሎቶች/ቢል መክፈል ☐

መ. የሞባይል ካርድ መሙላት ☐

ሠ. የሂሳብ አጠቃቀም አስተዳደር ☐

ረ. ሁሉም: _____☐

8. የሞባይል ባንኪንግ ችግር አጋጥሞዎት የንግድ ባንክ የደንበኞች አገልግሎትን አግኝተው ያውቃሉ?

ሀ. አዎ ☐ ለ. የለም ☐

"አዎ" ከሆነ መልስዎ፣ በተሰጠዎት አገልግሎት ምን ያህል ረክተዋል?

ሀ. በጣም አልረካሁም ☐

ለ. አልረካሁም ☐

ሐ. መካከለኛ/ገለልተኛ ☐

መ. ረክቻለሁ ☐

ሠ. በጣም ረክቻለሁ ☐

ረ. አይመለከተኝም ☐

ክፍል ፪፦ የሞባይል ባንኪንግ አገልግሎት ጥራት

እባክዎ ስለ ኢትዮጵያ ንግድ ባንክ የሞባይል ባንኪንግ መተግበሪያ (App) ለቀረቡት መግለጫዎች ያለዎትን የስምምነት ደረጃ ይግለጹ።

የመለኪያ ደረጃዎች:

(1 = በጣም አልስማማም፣ 2 = አልስማማም፣ 3 = ገለልተኛ/መካከለኛ፣ 4 = እስማማለሁ፣ 5 = በጣም እስማማለሁ)

ተ.ቁ.	የአገልግሎት ጥራት ዘርፎች	የመለኪያ ደረጃዎች				
		1	2	3	4	5
	በዳታ ትንተና ላይ የተመሠረተ የአጠቃቀም ምቾት					
1	የሞባይል ባንኪንግ መተግበሪያው (App) ከአጠቃቀም ልምዴ ጋር ራሱን ስለሚያላምድ ለመጠቀም ሁልጊዜ ቀላል ነው።					
2	የመተግበሪያው ገጽታ (Interface) እኔ በብዛት የምጠቀምባቸውን አገልግሎቶች መሠረት በማድረግ የምርጫ ዝርዝሮችን በጥበብ ያደራጃል።					
3	መተግበሪያው ቀደም ሲል ያደረግኳቸውን የገንዘብ ዝውውሮች በመተንተን የተለመዱ ተግባራትን በፍጥነት እንድከውን ሂደቱን ያቀላጥፋል።					
4	የመተግበሪያው ዘመናዊ አቀማመጥ እና ንድፍ አጠቃላይ የግብይት ተሞክሮዬን ቀላል ያደርገዋል።					
5	መተግበሪያው መረጃዎችን ሳስገባ የሚፈጠሩ ስህተቶችን አስቀድሞ በመለየት ለማስተካከል የሚረዱ ብልህ መመሪያዎችን ይሰጣል።					
6	የመተግበሪያው ግልጽ ንድፍ አዳዲስ አገልግሎቶችን በቀላሉ እንድማር እና እንድጠቀም ይረዳኛል።					
7	መተግበሪያው ፍላጎቶቼን አስቀድሞ ይገምታል (ለምሳሌ፡ በቅርቡ የተጠቀምኩባቸውን የሂሳብ ቁጥሮች በራሱ ይሞላል)፤ ይህም በግብይት ወቅት የምሠራቸውን ስህተቶች ይቀንሳል።					
	በዳታ ትንተና ላይ የተመሠረተ ምላሽ ሰጪነት					
1	መተግበሪያው ስለ ግብይቶቼ እና ስለ ጥያቄዎቼ ወቅታዊ መረጃዎችን በፈጣን ማሳወቂያዎች (Real-time notifications)በቅጽበት ይሰጣል።					
2	በባንክ እንቅስቃሴዬ ላይ መዘግየት ወይም ችግር ካጋጠመ አውቶማቲክ የሆነ የፈጣን መልዕክት ማሳወቂያ					

	ይደርሰኛል።					
3	መተግበሪያው እንደ የሂሳብ መግለጫ (Statement) ያሉ ጥያቄዎችን ያለ ረጅም ጥበቃ ለማስተናገድ በቂ ብቃት አለው።					
4	መተግበሪያው የሲስተም ጥገና በሚኖርበት ጊዜ አጠቃቀሜ ላይ ተጽዕኖ ከመፍጠሩ በፊት አስቀድሞ ማስጠንቀቂያ ይሰጠኛል።					
5	ችግር ሲያጋጥመኝ የመተግበሪያው አውቶማቲክ ድጋፍ ሰጪ (ለምሳሌ፡-smart FAQs or bots) ፈጣን እና ተገቢ መፍትሄዎችን ይሰጣል።					
6	መተግበሪያው ብዙ ሰው በሚጠቀምበት ሰዓት እንኳን ፈጣን እና አስተማማኝ ነው።					
	በዳታ ትንተና ላይ የተመሠረተ ግላዊ አገልግሎት					
1	መተግበሪያው የእኔን የግብይት ታሪክ በመተንተን ለእኔ ፍላጎት የሚመጥኑ የፋይናንስ መረጃዎችን እና ምክሮችን ይሰጣል።					
2	ከእኔ የወጪ ልምድ ጋር ተዛማጅነት ያላቸው ግላዊ ማሳወቂያዎች እና ማስጠንቀቂያዎች ይደርሱኛል።					
3	መተግበሪያው የሚያሳየኝ የወጪ ታሪክ እና የግብይት ማጠቃለያዎች ፋይናንሴን በተሻለ ሁኔታ እንዳስተዳድር ይረዱኛል።					
4	መተግበሪያው ቀደም ሲል በነበረኝ የአጠቃቀም ልምድ ላይ በመመሥረት የባንክ ምርጫዎቼን እንደሚያውቅ ይሰማኛል።					
5	መተግበሪያው የሚጠቀምልኝ የባንክ አገልግሎቶች እና የሂሳብ አማራጮች ከፋይናንስ ፍላጎቶቼ ጋር ተዛማጅነት አላቸው።					
6	መተግበሪያው ለእኔ በጣም አስፈላጊ የሆኑ መረጃዎችን እና ሂሳቦችን ለይቶ የሚያሳይ ለእኔ የተዘጋጀ ገጽ (Customized dashboard) ያቀርባል።					
	በዳታ ትንተና ላይ የተመሠረተ ደህንነት					

1	መተግበሪያው የግል እና የፋይናንስ መረጃዎቼን ለመጠበቅ የላቀ የዳታ ክትትል (Data monitoring) እንደሚጠቀም ማወቄ ደህንነት እንዲሰማኝ ያደርጋል።					
2	የመተግበሪያው የላቁ የመግቢያ መንገዶች (እንደ የጣት አሻራ ወይም የአንድ ጊዜ የምስጢር ቁጥር/OTP) መረጃዎቼ መጠበቃቸውን እምነት ይሰጡኛል።					
3	የባንኩ የክትትል ሥርዓት ያለፈቃድ ወደ ሂሳቤ ለመግባት የሚደረጉ ሙከራዎችን በቅጽበት ይለያል እንዲሁም ይከላከላል የሚል እምነት አለኝ።					
4	መተግበሪያው ግብይቶቼ በደህንነት መከናወናቸውን የሚያሳዩ ግልጽ ማረጋገጫዎችን እና ዲጂታል ደረሰኞችን ይሰጠኛል።					
5	የመተግበሪያው የደህንነት ሥርዓት ያለፈቃድ የሚደረጉ ግብይቶችን በፍጥነት እንደሚለይ እና እንደሚያግድ ሙሉ እምነት አለኝ።					
6	በሂሳቤ ላይ አጠራጣሪ እንቅስቃሴ ሲታይ ወዲያውኑ የሚደርሱኝ አውቶማቲክ ማሳወቂያዎች (Alerts) ትልቅ ዋጋ አላቸው።					
7	መተግበሪያው በሚወስዳቸው አስቀድሞ የመከላከል የደህንነት እርምጃዎች ምክንያት፣ ሚስጥራዊ መረጃዎችን ያለምንም ስጋት ለማስገባት ድፍረት ይሰጠኛል።					
	አጠቃላይ የደንበኞች ተሞክሮ					
1	በአጠቃላይ፣ የኢትዮጵያ ንግድ ባንክ በሚያቀርበው ብልህ እና ዘመናዊ የባንክ አገልግሎት በጣም ረክቻለሁ።					
2	መተግበሪያው ፍላጎቶቼን አስቀድሞ የመረዳት እና ሥራዎችን የማቃለል ብቃቱ የዕለት ተዕለት የባንክ አገልግሎቴን በጣም ቀላል አድርጎታል።					
3	የባንኩ የላቀ ቴክኖሎጂ ግብይቶቼን ሁልጊዜ በትክክል ስለሚያከናውን በንግድ ባንክ የሞባይል ባንኪንግ ላይ ከፍተኛ እምነት አለኝ።					

4	ከመተግበሪያው ብልህ አገልግሎቶች ጋር ያለኝ ግንኙነት ስለ ንግድ ባንክ የዲጂታል ፈጠራ በጣም ጥሩ አመለካከት እንዲኖረኝ አድርጓል።					
5	መተግበሪያው ከሌሎች ልማዳዊ አሠራሮች ይልቅ **ለእኔ የሚመጥን** አገልግሎት ስለሚሰጥ የንግድ ባንክ ሞባይል ባንኪንግን መጠቀሜን እቀጥላለሁ።					
6	የንግድ ባንክ ሞባይል ባንኪንግን ለሌሎች ሰዎች እመክራለሁ፤ በተለይም በላቀ፣ ለአጠቃቀም ምቹ እና አስተማማኝ በሆኑ የቴክኖሎጂ ባህሪያቱ ምክንያት።					

ክፍል ፫፦ አጠቃላይ አስተያየት

1. በኢትዮጵያ ንግድ ባንክ የሞባይል ባንኪንግ አገልግሎት ውስጥ በጣም የሚወዱት ነገር ምንድን ነው?

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2. በኢትዮጵያ ንግድ ባንክ የሞባይል ባንኪንግ ላይ እንዲሻሻሉ የሚመክሯቸው ሦስት ዋና ዋና ነገሮች ምንድን ናቸው?

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3. መተግበሪያውን ሲጠቀሙ ያጋጠመዎት የደህንነት ወይም የምስጢር ጥበቃ ስጋት አለ? ካለ፣ እባክዎ ይግለጹት።

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4. ስለኢትዮጵያ ንግድ ባንክ የሞባይል ባንኪንግ ተሞክሮዎ ያለዎት ሌላ ተጨማሪ አስተያየት ካለ፦

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እመሰግናለሁ!!!