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# Service Quality and Security in Ugandan E-Banking: Implications for Customer Satisfaction: A Systematic Literature Review

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**Abstract**

The rise of e-banking has significantly transformed the banking industry, introducing new dimensions of quality of service and customer satisfaction. However, existing studies have primarily focused on these aspects from a global perspective, with limited emphasis on the Ugandan context. This research aims to synthesize existing knowledge and identify key factors for developing a framework to enhance e-banking quality of service, security, and customer satisfaction in Uganda through a systematic literature review (SLR), guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines. The review follows a structured approach involving the identification, screening, eligibility, and inclusion stages as per PRISMA. A comprehensive search strategy across databases resulted in the inclusion of 21 studies out of an initial 103 articles. The findings reveal vital dimensions such as reliability, responsiveness, system availability, and privacy, among others, for enhancing e-banking quality of service. This study provides valuable insights for both academic and practical applications, emphasizing the need for context-specific research and laying the groundwork for future studies in the Ugandan e-banking sector.

**Keywords**: e-banking, quality of service, security, customer satisfaction, PRISMA

## 1. INTRODUCTION

The development of e-banking globally has been driven by advancements in Information and Communication Technologies (ICTs), significantly transforming service distribution and reshaping consumer behaviour [1]. This transition has led to the widespread adoption of online platforms for various services, including banking, where customers can access account balances, pay bills, and transfer funds through mobile applications, websites, and ATMs [2], [3]. The emergence of smartphones and improved telecommunications infrastructure has further propelled the adoption of e-banking, enabling customers to access banking services on the go.

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In Uganda, the banking sector has expanded rapidly, growing from a single state-owned bank in the 1990s to 25 commercial banks in 2024 [4], [5]. This transformation has been accompanied by the widespread adoption of e-banking services like mobile banking and online transactions[6], [7]. However, despite these advancements, customer satisfaction rates are still low in Uganda, ranging from 23% to 31%, as opposed to 51% and 62% in South Africa and Kenya, respectively [8].

Persistent challenges related to quality of service, security, and customer satisfaction have been highlighted by issues such as transactional inefficiencies, usability challenges, and a heightened threat of cybercrimes, compromising the integrity and confidentiality of financial information [9], [10]. These problems undermine customer confidence and pose a significant barrier to the broader acceptance and adoption of e-banking services [6], [11]. Cases of fraud and unauthorized access, such as the Centenary Bank financial loss of over UGX 800 million to its clients who were defrauded through ATM transactions. In 2016, criminals infiltrated the bank's records and falsified documentation indicating that Sh10 billion had been electronically transferred from multiple client accounts to a sole account at the Iganga branch of Centenary Bank, underscoring the need for improved security measures. [4].

Security is a critical factor in e-banking as financial transactions are electronically conducted, and customers are exposed to countless security threats such as identity theft, and unauthorized access [12]. Addressing these security concerns is fundamental to building customer trust and ensuring the long-term viability of e-banking platforms [13], [14]. Customer satisfaction on the other hand is a key determinant of the effectiveness of e-banking services. Meeting customer expectations, providing personalized services, and resolving issues promptly contribute to overall satisfaction [15].

Despite the growing body of literature on e-banking quality of service, and security, there is a gap in studies that integrate these two critical factors and their combined impact on customer satisfaction in the context of developing countries like Uganda [14], [16]. Previous studies have often focused on either quality of service or security without considering their interrelationship. For instance,[17] conducted a study that explored the effect of e-banking quality of service on customer satisfaction and loyalty in Ethiopia, utilizing a survey method to gather data from over 200 e-banking users. The study used factor analysis and regression to identify the quality of service dimensions affecting satisfaction but did not account for security issues. This study aims to synthesize existing knowledge and identify key factors for developing a framework to enhance e-banking quality of service, security, and customer satisfaction in Uganda through a SLR, guided by the PRISMA 2020 guidelines[1]. The study is guided by the main research question

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"How can e-banking systems be designed to enhance the quality of service, security, and customer satisfaction in Uganda?". This question was addressed through the following sub-questions:

1. What are the key dimensions that should be incorporated in the development of a framework to enhance e-banking quality of service, security, and customer satisfaction in Uganda?
2. How can a framework for enhancing e-banking quality of service, security, and customer satisfaction be developed in Uganda?

## 2. METHODS

This section outlines the methodological approach used in conducting the systematic literature review to explore the key dimensions and constructs for developing a framework to enhance e-banking quality of service, security, and customer satisfaction in Uganda.

### 2.1. Systematic Literature Review Protocol

This study used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 standards to ensure a transparent and replicable systematic review. The PRISMA guidelines provide a detailed framework for conducting systematic reviews, including a checklist and a flow diagram to document the process.

### 2.2. Development of Research Questions

The research questions were developed using the Population, Intervention, Comparators, and Outcomes (PICO) framework. This approach helps in formulating specific and relevant research questions. The central question addressed in this review is: "How can e-banking systems be designed to enhance the quality of service, security, and customer satisfaction in Uganda?" This is further divided into sub-questions focusing on the key dimensions and development of a framework to enhance these aspects in Uganda.

### 2.3. Systematic Search Strategies

The systematic search was conducted in three phases: identification, screening, and eligibility.

#### 2.3.1. Identification

A comprehensive search strategy was conducted across several databases namely Science Direct, Web of Science (WoS) and Scopus. Keywords used included "e-banking," "quality of service," "security," and "customer satisfaction." Boolean

operators (AND or OR) were used to combine these terms, ensuring the retrieval of relevant literature. Filters were applied to limit the search to articles published from 2015 onwards and those written in English. This initial search yielded 103 articles.

### 2.3.2. Screening Process

The selection procedure was carried out with great care and organization, guaranteeing the quality and applicability of the research that was included. The following were the steps involved:

1) **First Screening:** To organize the papers that were found, we used Mendeley Reference Manager. After that, they were exported to Excel for additional handling. Using the sorting features of the Web of Science (WoS), Science Direct, and Scopus databases, an automated criteria selection procedure was used, following the advice of [18], was employed using the sorting functions of the Web of Science (WoS), Science Direct and Scopus databases.
2) **Criteria for Inclusion:** The search was confined to articles published between 2015 and 2024. This timeframe was chosen to capture the most up-to-date research and recent advancements in e-banking quality of service, security, and customer satisfaction. Only articles published in English were included to ensure clarity. 62 duplicate records were removed, ensuring no redundancy in the dataset.
3) **Detailed Screening:** The titles and abstracts of the 41 surviving articles were used to determine their applicability. Articles that did not fall under the purview of e-banking security, quality of service, and customer satisfaction were not included. After passing the first round of relevancy screening, the papers underwent a full-text evaluation. In this step, a comprehensive evaluation was conducted using predetermined inclusion and exclusion criteria. Articles that were released before 2015, were not written in English, did not sufficiently discuss e-banking, or featured unrelated outcomes were all excluded.
4) **Final Selection:** 21 papers that satisfied the inclusion criteria were included in the final review following the full-text review. The foundation for the methodical study and creation of the conceptual framework was laid by the extensive data on e-banking quality of service, security, and customer satisfaction that these studies offered.

### 2.3.3. Eligibility Criteria

The full-text review involved a thorough quality assessment using predefined criteria. Articles were included if they met the following criteria: Focused on e-banking quality of service, security, and customer satisfaction, published in peer-

reviewed journals, and Used qualitative, quantitative, or mixed-method approaches.

### 2.3.4. Data collection process

A standardized form was used to extract data from the 21 eligible studies. This covered the study's design (year, country, sample size, and methodology), results about the calibre of e-banking quality of service, security concerns, and measures of customer satisfaction. After that, the extracted data were combined narratively and, if feasible, statistically. Figure 1 illustrates how this process.

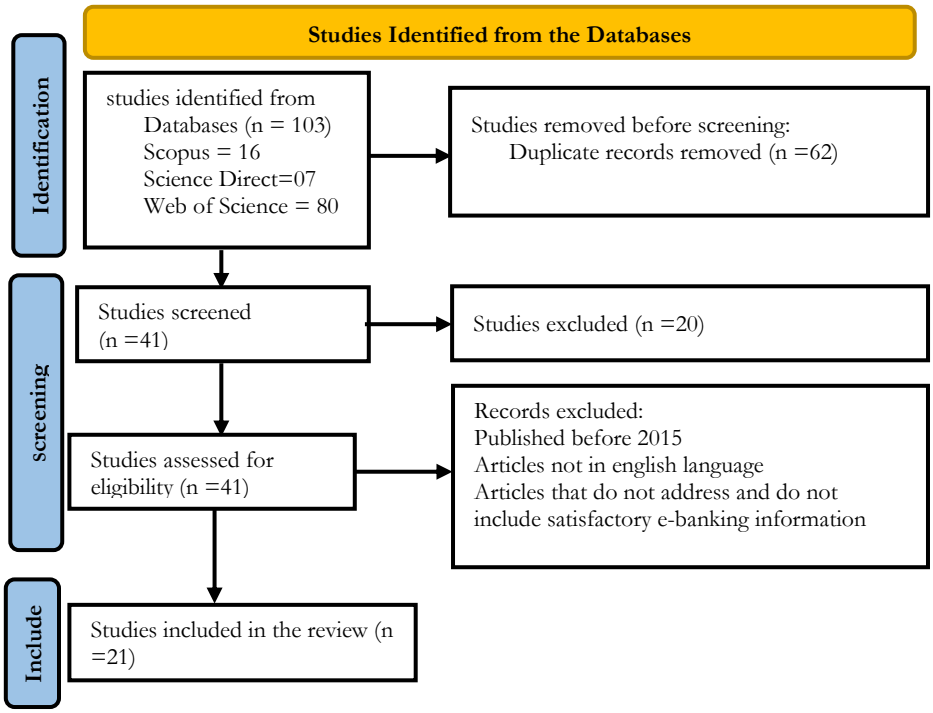


**Figure 1.** The PRISMA 2020 checklist.

## 3. RESULTS AND DISCUSSION

This section presents the findings of the systematic literature review, organized to answer the research questions. The results are categorized under three main themes: key dimensions for enhancing e-banking quality of service, security, and customer satisfaction in Uganda; and development of a framework for these enhancements.

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### 3.1. Study Characteristics

Studies that were included differed in terms of target areas, theories, sample size, age range, hypothesis, country and research designs. Key characteristics are summarized in Table 1. Studies from diverse geographic regions such as Ethiopia [17], [19], and India [20], [21] provided a broad perspective on e-banking issues, including security and quality of service.

**Table 1.** Features of the studies that were used

| Author and Year | Country | Sample Size | Theory | Methodology | Research design |
|---|---|---|---|---|---|
| Ayinaddis et al. (2023)[17] | Ethiopia | 300 | SERVQUAL | Quantitative | Cross-Sectional |
| Beshir & Zelalem (2020) [19] | Ethiopia | 250 | SERVQUAL | Quantitative | Cross-Sectional |
| Shankar & Jebarajakirthy (2019) [20] | India | 400 | E-S-QUAL | Quantitative | Cross-Sectional |
| Sharma et al. (2020) [21] | India | 350 | E-S-QUAL | Quantitative | Cross-Sectional |
| Hammoud et al. (2018) [16] | Lebanon | 220 | E-S-QUAL | Quantitative | Cross-Sectional |
| Serrah & Binti Haja Maideen (2022) [22] | Malaysia | 280 | SERVQUAL | Quantitative | Cross-Sectional |
| Ahmed et al. (2021) [23] | Pakistan | 300 | E-S-QUAL | Quantitative | Cross-Sectional |
| Usman et al. (2020) [24] | Nigeria | 250 | E-S-QUAL | Quantitative | Cross-Sectional |

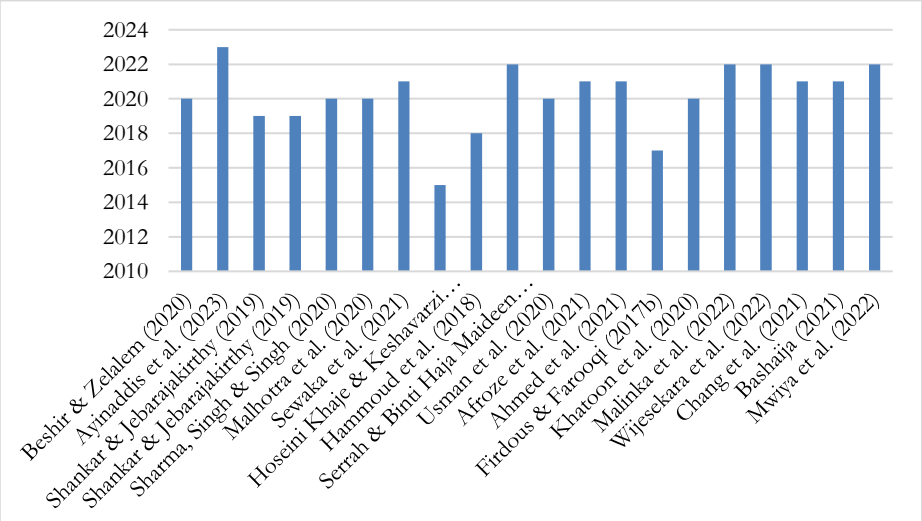


**Figure 2.** Studies conducted between 2015 – 2024

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Figure 2 presents an analysis of studies conducted on e-banking quality of service, security, and customer satisfaction from 2015 to 2024. During this period, there has been a significant increase in research focused on the evolving landscape of e-banking in developing countries.

### 3.2. Models used in studies on e-banking

Figure 3 shows several measurement models on e-banking quality of service, security, and customer satisfaction that were used in studies which include SERVQUAL, E-S-QUAL, and the. SERVQUAL [25] assesses the quality of service across five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. This model was widely used to evaluate e-banking quality of service and its impact on customer satisfaction. E-S-QUAL, an extension of the SERVQUAL model, specifically addresses the quality of electronic services through dimensions such as efficiency, system availability, fulfilment, and privacy[26]. These dimensions are particularly relevant for evaluating the performance of e-banking services, modified E-S-QUAL, often referred to as modified e-SERVQUAL has been adapted to better fit the context of e-banking by incorporating elements like security, and responsiveness to reflect the unique requirements of electronic service delivery. These measurement models have been employed in various studies to understand how different aspects of quality of service and security influence customer satisfaction in the context of e-banking, particularly in developing countries as shown in Table 2.

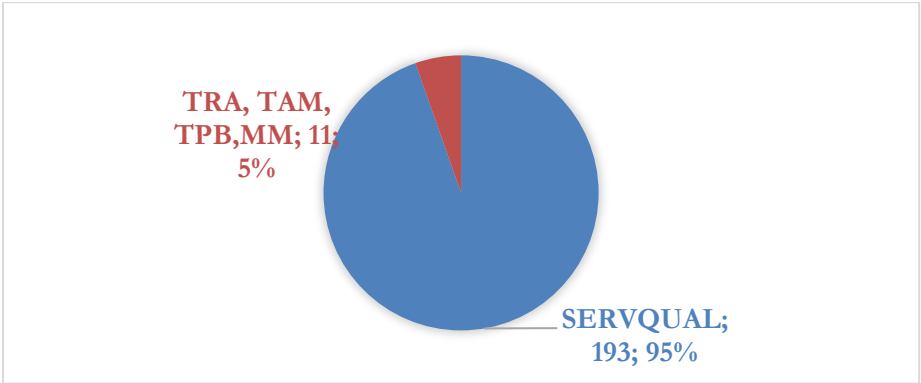


**Figure 3.** Models used in research studies

**Table 2.** Key findings

| Author(s) and year | Country | Key Findings |
|---|---|---|
| Ayinaddis et al. (2023) [17] | Ethiopia | All dimensions of quality of service in e-banking specifically fulfilment, privacy, efficiency, system availability, |

| Author(s) and year | Country | Key Findings |
|---|---|---|
| | | responsiveness, and reliability contribute individually to 70% of the overall customer satisfaction in e-banking. |
| Beshir & Zelalem (2020) [19] | Ethiopia | identified privacy, efficiency, ease of use, responsiveness, and commission as determinant factors of customer satisfaction at a significance level of 5%. |
| Shankar & Jebarajakirthy (2019) [20] | India | Reliability, security, and privacy were most influential in predicting customer satisfaction. |
| Sharma, Singh & Singh (2020) [21] | India | findings indicated that the most important variables were security, and reliability in predicting customer satisfaction. |
| Malhotra et al. (2005) [26] | India | Reliability and security were major predictors of customer satisfaction |
| Sewaka et al. (2021) [27] | Indonesia | The quality of service is closely linked to customer satisfaction. |
| Hoseini Khaje & Keshavarzi (2015) [28] | Iran | system availability, fulfilment, efficiency, privacy, trust, and quality of service, aesthetics affect customer satisfaction |
| Hammoud et al. (2018) [16] | Lebanon | Customer satisfaction is greatly impacted by ease of use, reliability, responsiveness, communication, security, efficiency and privacy. Reliability had the most pronounced effect on customer satisfaction. |
| Serrah & Binti Haja Maideen (2022) [22] | Malaysia | Customer satisfaction was most affected by website design, then by reliability, system availability, security, and privacy. |
| Usman et al. (2020) [24] | Nigeria | Efficiency, flexibility, and simplicity positively influence customer satisfaction. |
| Ahmed et al. (2021) [23] | Pakistan | Security and reliability are critical for customer satisfaction |
| Firdous & Farooqi (2017b) [29] | Pakistan | Security is a key factor influencing customer satisfaction |
| Khatoon et al. (2020) [30] | Qatar | efficiency, reliability, responsiveness, security, communication, and privacy exert a notable influence on customers' inclination to make purchases. |
| Mwiya et al. (2022) [14] | Zambia | All factors positively influenced customer satisfaction |
| Malinka et al. (2022) [31] | South Africa | Security and quality of service significantly affect customer satisfaction. |

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### 3.3. Key Dimensions for Enhancing E-Banking Quality of Service, Security, and Customer Satisfaction in Uganda

The SLR identified several key dimensions critical to the development of a framework aimed at enhancing e-banking quality of service, security, and customer satisfaction in Uganda.

#### 3.3.1. Conceptual Framework

Figure 4 presents the key aspects of e-banking quality of services, security, and customer satisfaction, as identified through the systematic literature review.

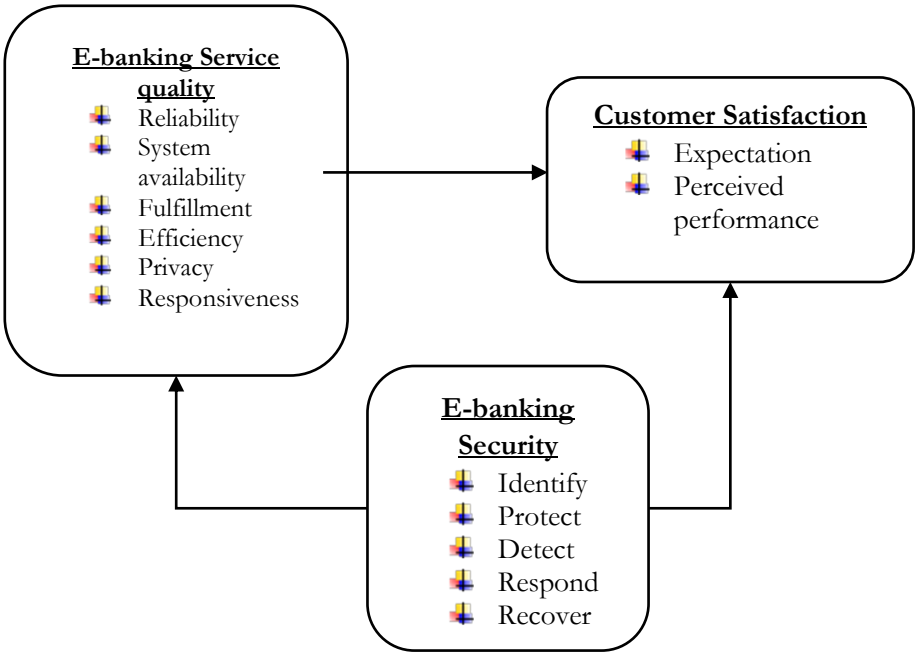


**Figure 4**. Conceptual framework

Figure 4 shows how different constructs interact to influence customer satisfaction and the overall customer experience in e-banking. It integrates elements from key models such as the E-S-QUAL, SiteQual, NIST models, and the Expectation-Confirmation Theory to provide a complete view of the factors affecting e-banking customer satisfaction in Uganda. Quality of service impacts customer satisfaction directly through constructs like reliability, efficiency, system availability, fulfilment, privacy, and responsiveness. E-banking security directly influences customer satisfaction by ensuring safe and secure transactions which build customer trust and satisfaction. The interplay between E-Banking Quality of

service and Security leads to an enhanced e-banking customer experience which is the ultimate goal of the framework.

### 3.3.2. Quality of service dimensions

Several critical dimensions of quality of service, that should be incorporated into the framework for enhancing e-banking services in Uganda were drawn from empirical studies that explored various factors influencing quality of service, and customer satisfaction in e-banking. [17] and [14] emphasize the importance of reliability, fulfilment, systems availability, privacy, responsiveness, and efficiency in improving the quality of e-services.

1) **Reliability:** Consistency in performance and dependability in service delivery were highlighted as crucial aspects of e-banking quality of service.[16] found that reliability is the most significant predictor of customer satisfaction, as it directly influences the consistency and dependability of e-banking services.
2) **Responsiveness:** Prompt and helpful customer support services were found to significantly impact user satisfaction. [19], customers value quick response times in resolving issues encountered during transactions.
3) **System Availability:** Ensuring that e-banking platforms are consistently available with minimal downtime is crucial [28]. System availability is a key aspect of quality of service that impacts customer satisfaction, as customers expect to access banking services whenever they need to. [17], [28] emphasized the importance of maintaining high system availability to build customer trust.
4) **Efficiency:** refers to the speed and ease with which customers can complete their transactions on e-banking platforms [31]. Efficient systems reduce the time and effort required by users, leading to higher satisfaction. [24], [30] argued that efficient e-banking services are essential for meeting customer expectations and enhancing satisfaction.
5) **Fulfilment:** measures how well the e-banking service meets customer expectations and promises, such as completing transactions accurately and on time[32]. [17], [28] suggested that customers' perceptions of fulfilment are closely tied to their overall satisfaction with e-banking services.
6) **Privacy:** involves the protection of customer information from unauthorized access or disclosure[30]. Ensuring customer privacy is a fundamental aspect of quality of service [22]. Customers are more likely to trust and use e-banking services if they are confident that their personal and financial information is kept private [16], [22].

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### 3.4. Security dimensions

Security remains a critical concern for e-banking customers [29]. [6] highlighted the need for robust security protocols to mitigate risks such as cybercrimes and unauthorized access. To address these concerns, the National Institute of Standards and Technology (NIST) Cybersecurity Framework's five core functions were applied. These functions provide a structured approach to managing cybersecurity risks in the context of e-banking.

1) **Identify function** involves understanding the bank's cybersecurity risks and identifying the assets that need protection [33], this includes recognizing critical information systems, customer data, and financial records that are susceptible to threats. [23], argued that it is crucial to conduct risk assessments to determine vulnerabilities in e-banking platforms. Identifying these vulnerabilities helps in prioritizing resources and implementing necessary safeguards to protect sensitive information.
2) **Protect function** focuses on implementing safeguards to ensure the security of information systems and reduce the impact of potential cybersecurity events[33]. [31], stated that protection mechanisms are essential for safeguarding customer data and ensuring secure transactions. For example, implementing end-to-end encryption in e-banking platforms prevents unauthorized access to financial data during transmission. Similarly, multi-factor authentication adds an extra layer of security, reducing the risk of unauthorized account access[34].
3) **Detect function** emphasizes the importance of identifying cybersecurity incidents promptly, this includes monitoring network activity, employing intrusion detection systems, and regularly auditing system logs for any unusual behaviour [33]. [31], found out that effective detection mechanisms are vital for identifying and mitigating threats before they cause harm, continuous monitoring of e-banking systems for suspicious activities helps banks to quickly respond to potential breaches, minimizing the impact on customers and maintaining the integrity of their services.
4) **Respond function:** involves developing and implementing appropriate activities to act against detected cybersecurity incidents, this includes incident response planning, communication protocols, and containment strategies [33]. [31] found out that a robust response plan ensures that banks can quickly and effectively address security breaches, this includes notifying affected customers, containing the breach to prevent further damage, and working with law enforcement if necessary.
5) **Recover function** focuses on restoring normal operations and services after a cybersecurity incident has occurred, this includes developing and implementing plans for system restoration, data recovery, and continuous improvement of security practices [33]. [31] recovery is a critical aspect of maintaining customer confidence in e-banking services. After an incident,

banks must ensure that affected systems are fully restored, and any compromised data is recovered securely [31], [33]. Additionally, lessons learned from the incident should be used to strengthen the bank's cybersecurity posture, preventing future occurrences.

6) **Customer Satisfaction:**
Kumar Reddy [17], defined customer satisfaction as the evaluation made by customers after purchasing a service, taking into consideration their expectations. [14], [17] argued that customer expectation is characterised by a set of presumptions about services that act as a standard for evaluating the quality of the service purchased. Furthermore, customer satisfaction is a key outcome variable in e-banking research, reflecting the extent to which customers' expectations are met or exceeded by e-banking services [16], [26]

### 3.5. Synthesis of Results

The meta-analysis conducted in this study sheds light on the correlation between e-banking quality of service, security, and customer satisfaction within the Ugandan setting. The results in Table 3 demonstrate that e-banking quality of service positively increases customer satisfaction. A computed mean difference of 0.439, with a 95% confidence interval (CI) spanning from 0.39 to 0.49 supports this. This positive relationship underscores the importance of enhancing various dimensions of quality of service, including system availability, reliability, efficiency, fulfilment, privacy, and responsiveness, to improve customer satisfaction levels with e-banking services.

**Table 3**. Meta-Analysis results

| Dimension | Combined Effect Size (Mean) | 95% CI | $I^2$ (%) |
|---|---|---|---|
| Quality of service | 0.439 | [0.39, 0.49] | 45 |
| Security | 0.483 | [0.44, 0.53] | 50 |

On the contrary, security concerns show a significant positive association with customer satisfaction, reflected in a risk ratio of 0.483 and a 95% CI spanning from 0.44 to 0.53. This positive correlation suggests that effective security measures, which address customers' concerns about the safety of their transactions and personal data, can lead to higher levels of satisfaction. The importance of security in e-banking is highlighted, indicating that robust security protocols not only protect users but also contribute to their overall satisfaction. The combination of these findings emphasizes how crucial quality of service and security are to e-banking customer satisfaction.

### 3.6. Development of a Framework for Enhancing E-Banking Quality of Service, Security, and Customer Satisfaction in Uganda

Figure 4 was constructed by synthesizing insights from the systematic literature review with existing theoretical models such as E-S-QUAL, Site-QUAL, NIST, and the Expectation-Confirmation Theory (ECT). It focuses on critical dimensions of quality of service, security, and customer satisfaction, addressing the unique challenges within the Ugandan context [26], [35]. The framework proposes a synergistic approach, where enhancements in quality of service are closely integrated with robust security measures. For example, improving system reliability is coupled with the strengthening of data protection protocols, ensuring a holistic improvement in e-banking services. A customer-centric approach is central to the framework, emphasizing the importance of designing and delivering e-banking services based on continuous customer feedback. This iterative process allows for the analysis of customer experiences, which is then used to refine and enhance service offerings

## 4. CONCLUSION

The findings from this study align with the established literature on e-banking quality of service and security. Similar to E-S-QUAL model, our study confirms the importance of reliability, systems availability, efficiency, fulfilment, privacy and responsiveness as critical dimensions of quality of service. However, our research extends these dimensions by integrating security concerns, which are particularly pertinent in the Ugandan context. This integration is crucial for addressing the unique challenges faced by banks in developing countries where trust and data protection and the overall security of e-banking platforms significantly influence customer satisfaction.

The framework builds on these dimensions by offering a structured approach to enhance the quality of service, security, and customer satisfaction in the e-banking sector of developing countries. This review underscores the critical role that quality of service and security play in shaping customer experiences. Practitioners in the e-banking industry should prioritize the implementation of robust security measures alongside continuous enhancement of quality of service to foster customer trust and satisfaction. Regular monitoring and upgrading of e-banking systems are essential to mitigate security threats and improve the overall user experience, which is vital for maintaining high levels of customer satisfaction. Policymakers in developing countries should prioritize the development of thorough regulatory frameworks that accommodate the changing e-banking landscape. These frameworks should enforce stringent security protocols and quality of service standards to ensure the reliability and security of e-banking services.

Future research should focus on validating this framework across various contexts within developing countries and exploring its applicability and effectiveness. Additionally, investigating the role of risk management strategies in enhancing e-banking quality of service and security could provide further insights. This systematic literature review provides a comprehensive analysis of e-banking quality of service, security, and customer satisfaction, particularly within the context of Uganda and other developing countries. The findings highlight the importance of context-specific research in addressing the unique opportunities and challenges in the e-banking sector present in these regions. By identifying key dimensions and trends, this review provides valuable insights for both academic researchers and industry practitioners aiming to improve e-banking quality of service, security and customer satisfaction across developing countries.

**Data Availability Statement:** No primary data was used in this review.

**Competing Interest:** The authors declare no competing interests.

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