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From Swipe to Stay: How Digital Banking Service Quality Drives Customer Retention through Customer Satisfaction

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Abstract

While the adoption of digital banking continues to rise, research on how digital service quality affects customer retention is limited. This study applies an E-S-QUAL-based framework to assess how dimensions of digital banking service quality (DBSQ) influence customer satisfaction and their mediating role in customer retention within commercial banks in Kathmandu Valley. A cross-sectional design was used, collecting data from 426 respondents through structured questionnaires and analyzed through SmartPLS 4.0. Results show that among the five DBSQ dimensions, efficiency, ease of use, and security significantly affect customer satisfaction. Customer satisfaction, in turn, has a significant impact on customer retention and partially mediates the relationship between service quality and retention. These findings highlight the critical role of digital service quality in enhancing customer satisfaction and loyalty. The study offers valuable insights for banks and policymakers aiming to improve digital banking experiences to foster stronger customer retention.

Keywords: Customer retention, customer satisfaction, digital banking, E-S-QUAL, service quality

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Introduction

In today's intensely competitive and digitized financial environment, customer retention has become a cornerstone of strategic success for banking institutions worldwide. While digital innovation has transformed banking operations, the real challenge lies not in customer acquisition but in long-term retention, given that acquiring a new customer costs five times more than retaining an existing one (Gomber et al., 2018). With minimal switching costs in today's digitized banking environment, customer retention has become not only a strategic priority but also a critical performance indicator influenced by the quality of digital interfaces (Mbama et al., 2018).

Service quality reflects the gap between customers' expectations and their perceptions of actual service performance (Prakash & Mohanty, 2013). Parasuraman et al. (1988) conceptualized service quality through the SERVQUAL model, encompassing five key dimensions: tangibles, reliability, responsiveness, assurance, and empathy. In contrast, Cronin and Taylor (1992) proposed the service performance (i.e., SERVPERF) model, which assesses service quality based solely on performance perceptions. As the banking ecosystem becomes increasingly digital-first, institutions must understand how service quality in digital interactions impacts customers' continued engagement (Lóska & Uotila, 2024).

Traditional loyalty mechanisms no longer suffice; instead, banks must ensure superior digital service quality by adapting to evolving customer expectations and technological advancements to avoid attrition (Bankuoru et al., 2021; Skaf et al., 2024). Digital service quality measures how effectively digital channels deliver services that meet customer expectations. It enhances customer satisfaction, promotes repeat usage and loyalty, and strengthens competitive advantage in the growing and competitive online marketspace (Schiavone et al., 2023). Failure to do so can result in high attrition rates, eroded market share, and diminished brand equity.

With banking services now delivered through mobile apps, online portals, and automated systems, customers demand seamless usability, system reliability, responsive service, and robust data security (Dağaşaner & Karaatmaca, 2025). These expectations have intensified in the post-COVID era, where digital channels became primary customer touchpoints almost overnight (Candy et al., 2022). As a result, digital service quality directly influences not only satisfaction but also long-term retention. Despite the proliferation of research on digital banking, most existing studies focus on adoption or satisfaction, often failing to examine whether these experiences lead to continued usage and loyalty.

While digital banking has emerged as a transformative force in the financial sector (Karmacharya et al., 2025), extant research has predominantly focused on the relationship between digital banking service quality (DBSQ) and customer satisfaction (Bankuoru et al., 2021). However, the critiques of the recent empirical studies reveal a noticeable gap: limited attention has been given to understanding how the service quality dimensions influence customer retention. Although prior research has extensively validated DSBQ dimensions about customer satisfaction (Ketema, 2020; Raza et al., 2020), there is a conspicuous empirical gap in understanding how these same service quality indicators influence customer retention.

Most existing studies stop short at satisfaction or loyalty, implicitly assuming that high satisfaction naturally translates into retention. However, this assumption may not hold in volatile, tech-driven service environments where customers can easily disengage due to minor lapses in usability, speed, or security. the potential mediating role of customer satisfaction in the service quality-retention relationship remains underexplored, particularly in post-pandemic digital banking environments where customer expectations have fundamentally shifted. Customer satisfaction remains a critical mediating variable because it serves as the psychological link between users' interaction with digital banking services and their behavioral outcomes.

Traditional models like SERVQUAL and Bank Service Quality (BSQ) have proven valuable in assessing tangible and interpersonal aspects of service in a physical banking environment (Sreejash, 2024) but overlook digital-specific features. But these traditional satisfaction metrics may no longer be sufficient to predict whether customers will continue using a bank's digital services. This necessitates a shift in scholarly focus, from satisfaction to retention intentions, to more accurately capture the long-term effects of service quality in digital banking. In contrast E-S-QUAL model, developed by Parasuraman et al. (2005), was specially designed to evaluate the quality of e-service environment and effectively captures ease of use, efficiency, interoperability, privacy/security, and responsiveness, making it a more relevant and contextually appropriate framework for studies focused on digital banking.

The digital banking revolution has redefined customer expectations globally, yet disparities persist between developed and developing nations. In advanced economies, high internet penetration, robust digital infrastructure, and stringent cybersecurity frameworks enable seamless digital banking experiences, directly influencing customer retention (Parasuraman et al., 2005). In contrast, developing countries grapple with infrastructural deficits, low digital literacy, and security concerns, which hinder digital banking adoption and weaken retention rates (Hasan, 2010). This represents a critical knowledge gap, as blindly applying Western models to developing economies risks overlooking eminent factors that may fundamentally alter the service quality-retention relationship.

In addition, this empirical gap is particularly evident in South Asia and especially acute in Nepal, where digital banking is rapidly expanding but remains under-researched. Internet penetration in Nepal reached 72.5% in 2023, and over 9 million customers now use mobile banking platforms (Statista, 2025). Yet, adoption does not guarantee retention. This adoption-reality gap stems from persistent concerns: 32% of users cite security fears, 28% report dissatisfaction with service responsiveness, and 19% encounter frequent transaction failures (Tan et al., 2016). These statistics reveal a troubling disconnect: while banks have successfully digitized operations, many have failed to deliver the service quality necessary for long-term retention. Compounding this issue, Nepal's unique challenges, including interoperability gaps between banking platforms, create retention dynamics that existing models may not fully capture.

This study makes significant contributions to bridging these gaps. First, it develops and examines a holistic framework grounded on the E-S-QUAL model, examining how the DBSQ dimensions (i.e., ease of use, efficiency, interoperability, privacy/security, and responsiveness)

influence customer satisfaction in the Nepalese commercial banking sector (Ariff et al., 2013). Second, it investigates customer satisfaction's mediating role in this relationship, providing insights into the psychological mechanisms linking service quality to retention. Through an integrative approach by combining technological service attributes with behavioural outcomes, this study not only advances academic understanding of digital banking retention in developing economies but also assists the bank managers and policy makers in leveraging digital banking services as a competitive advantage and building a loyal customer base.

Literature Review

Overview of Digital Banking

Digital Banking marks a paradigm shift from traditional branch-based models. It embraces technology to offer seamless, real-time financial services across multiple digital channels, including mobile apps, internet banking platforms, ATMs, and digital payment systems (Shrestha & Kayestha, 2024). This shift has enabled banks to overcome geographic constraints, offering customers 24/7 access to services such as fund transfers, bill payments, and electronic statements while promoting efficiency, convenience, and satisfaction (Maharjan et al., 2022).

The journey of digital banking has evolved over decades, shaped by key technological milestones. The period from the 1950s to the 1980s laid the foundation with mainframe computers and the introduction of ATMs, pioneered by Barclays Bank in 1967, which revolutionized cash withdrawal services (Bátiz-Lazo, 2009). Citibank's launch of the first dial-up online banking service in 1983 marked an early attempt at remote banking, though adoption was limited due to technical constraints (Kaptan, 2002). With the advent of the internet in the 1990s, banks began offering secure online banking platforms, expanding their reach and operational capacity. Notably, Boursorama Bank in France emerged in 1995 as one of the earliest digital-only banks, challenging conventional service models (Boursorama, 2015). The 2000s ushered in mobile banking, exemplified by USAA's 2007 mobile app launch, which allowed customers to manage accounts directly from their smart phones (Cleveland, 2016).

Since the 2010s, the digital banking landscape has been further transformed by emerging technologies such as artificial intelligence, blockchain, big data analytics, biometrics, and cloud computing. These innovations have enhanced personalization, security, and customer interaction through tools like chatbots, predictive analytics, and biometric authentication (Chou & Chou, 2000; Lee & Lee, 2020).

Technological advancements have significantly accelerated digital banking adoption (Koirala et al., 2024). Innovations in mobile wallets, online transactions, and paperless banking have transformed how customers interact with financial services (Kaur, 2024). In response, banks have intensified their investment in digital infrastructure, with around 50% making digital transformation a strategic priority to meet evolving customer expectations (Ononiwu et al., 2024). Beyond convenience, digital banking customer intimacy through

continuous engagement while simultaneously reducing operational costs by minimizing dependence on physical branches. As the sector continues to innovate, the quality of digital banking services has emerged as a critical determinant of customer satisfaction and retention.

Digital Banking Service Quality

The evolution of digital banking has fundamentally transformed how customers perceive and evaluate service quality, shifting the paradigm from physical branch interactions to technology-driven experiences. Unlike traditional banking, where quality was assessed through tangible cues like staff behavior or physical ambiance, digital banking service quality is inherently intangible and multidimensional, requiring a more nuanced approach to measurement (Parasuraman et al., 2005).

Digital service quality plays a pivotal role in shaping customer experience and retention. In the context of digital banking, service quality encompasses dimensions such as reliability, security, responsiveness, design, convenience, and system availability (Zavareh et al., 2012; Narteh, 2018). Zhengmeng (2024) confirmed a strong relationship between convenience in digital banking and customer satisfaction, which in turn fosters loyalty. However, while much literature focuses on satisfaction, the specific link between digital service quality and customer retention remains underexplored.

Research identifies six core dimensions that define digital banking service quality: system reliability, security assurance, user experience design, responsive support, personalization, and omnichannel consistency (Ladhari, 2010; Flavián et al., 2020). System reliability, ensuring seamless, error-free transactions, is foundational, with studies indicating that 78% of customers abandon digital banking after encountering technical issues (Raza et al., 2020). Security is critical, especially as cyber threats rise; features like biometric authentication and real-time fraud detection are indispensable in maintaining customer trust (Narteh, 2018). Intuitive interfaces reduce cognitive load and can enhance satisfaction by up to 42% (Flavián et al., 2020). Responsive support, including AI-driven chatbots, has been shown to improve retention when queries are resolved swiftly (Anderson, 2024). Personalization, powered by machine learning, increases customer engagement, while omnichannel consistency reduces customer effort by ensuring a unified experience across digital and physical touchpoints.

The relationship between digital service quality and customer retention operates through cognitive, affective, and behavioral pathways. Cognitively, expectation-confirmation theory suggests that when service quality exceeds expectations, retention intentions are reinforced (Fu et al., 2018). Affectively, emotional engagement is key; satisfied customers are significantly more likely to recommend their bank (Levy & Hino, 2016). Behaviourally, high-quality digital services create switching barriers; customers using multiple digital features exhibit lower churn rates. Despite these insights, the long-term retention implications of digital service quality remain insufficiently examined.

Two theoretical models are frequently applied to assess digital service quality: SERVQUAL and E-S-QUAL. These frameworks help identify the drivers of perceived quality in digital interfaces where direct human interaction is limited, but user experience remains central.

Studies by Raza (2020) and Ketema (2020) have largely focused on satisfaction, with limited emphasis on retention. Yet, in an increasingly competitive digital environment where switching costs are low, retaining customers is as critical as acquiring them. This highlights the need for deeper exploration of how service quality influences long-term engagement.

Emerging challenges further complicate the delivery of high-quality digital banking services. The privacy-personalization paradox presents a dilemma: while 63% of customers demand personalized services, many are uncomfortable with the data collection involved (Kopf, 2022). Moreover, the digital divide affects service perceptions, older users report lower satisfaction due to interface complexity. Post-pandemic shifts have also raised expectations, with 24/7 availability and rapid response times becoming standard.

Thus, digital banking service quality is no longer just a technological concern but a strategic imperative grounded in human-centered design. Banks that prioritize seamless, secure, and personalized digital experiences are more likely to enhance satisfaction and foster long-term customer loyalty in a dynamic and low-switching-cost environment.

Theoretical Foundations and Model Selection

The assessment of digital banking service quality has evolved through several theoretical models, each offering unique perspectives on customer retention. The E-S-QUAL model (Parasuraman et al., 2005) focuses on efficiency, system availability, fulfillment, and privacy, making it particularly relevant for digital interfaces. Meanwhile, the BSQ model (Gera, 2013) extends SERVQUAL by incorporating banking-specific dimensions such as effectiveness, access, and service portfolio. The following table presents a summary of selected empirical studies that have utilized these models in various national and digital banking contexts.

Table 1

Review of Empirical Studies on Digital Banking Services

Study	Model	Context	DBS Service Dimensions Used
Ketema (2020)	E-S-QUAL	Mobile banking service quality in Ethiopia	Reliability, Efficiency, Privacy /Security, Ease of Use, Responsiveness, Empathy
Raza et al. (2020)	E-S-QUAL	Internet banking and its effect on satisfaction and loyalty in Saudi Arabia	Site Organization, Reliability, Responsiveness, User Friendliness, Efficiency, Personal Need
Mujinga (2020)	E-S-QUAL	E-banking service quality in South Africa	Efficiency, Fulfilment, Privacy, System Availability

Amin (2016)	Conceptual (E-S-QUAL-based)	Internet banking service quality in Malaysia	Site Organization, User Friendliness, Efficiency
Bankuoru (2021)	Cognitive-Motivational Relational Theory (E-S-QUAL dimensions used)	Impact of e-banking service quality on loyalty in Pakistan	Reliability, Privacy/ Security, Site Design, Service Support
Murali et al. (2016)	SERVQUAL	Investigated after-sales service quality and its impact in India	Reliability, Responsiveness, Assurance, Empathy, Tangibles
Narteh (2018)	SERVQUAL and BSQ	Explored retail banking service quality and satisfaction in Ghana	Tangibles, Reliability, Assurance, Empathy, Price
Shayestehfar and Yazdani (2019)	BSQ	Compared banking service quality across Iranian bank branches	Access, Assurance, Effectiveness
Sumardiningsih et al. (2012)	BSQ	Studied banking reliability and service portfolio on satisfaction	Reliability, Tangibles, Service Portfolio
Shahabi et al. (2021)	TAM and DOI	Assessed COVID-19's influence on e-banking adoption in Iran	Ease of Use, Perceived Utility, Trust, Attitude, Satisfaction, Regulations
Al-Ghraibah (2020)	TAM and Social Exchange Theory	Investigated predictors of online customer retention in Saudi Arabia	Attitude, Ease of Use, Responsiveness

Note. Compiled by the Authors

Conceptual Model and Hypothesis Development

Based on an extensive review of digital banking and service quality literature, this study conceptualizes customer retention in digital banking through the lens of the E-S-QUAL model developed by Parasuraman et al. (2005). The E-S-QUAL framework is particularly suited for evaluating electronic service environments and captures key quality dimensions that shape users' digital experiences.

Drawing from this model, the present study adopts five core constructs, ease of use, efficiency, interoperability, privacy/security, and responsiveness, as indicators of DBS quality. Prior research consistently identified these constructs as critical in assessing user interaction,

transactional performance, and data security within digital banking platforms (Mbama et al., 2018; Kelecic, 2020). Customer satisfaction is positioned as a mediating variable that channels the effects of these service quality dimensions on customer retention, the study's outcome variable. This conceptual model reflects the understanding that while service quality dimensions shape users' perceptions, it is their satisfaction that drives their long-term commitment to a digital banking platform.

Figure 1

Research Model

Ease of Use and DBS Customer Satisfaction: Ease of use refers to how user-friendly and easy to navigate a digital application is for customers (Parasuraman et al., 2005). It is a key component of human-computer interaction that promotes user adoption and continued engagement with technology (Sundar et al., 2016). In digital banking, interface simplicity plays a vital role in shaping customer experience, as systems that are easy to operate tend to enhance user satisfaction and loyalty. Studies by Simon et al. (2016) and Zavareh et al. (2012) show that user-friendly e-services significantly impact customer satisfaction. Similarly, Amin (2016) found a strong positive relationship between ease of use in e-banking systems and customer satisfaction. Alalwan et al. (2018) further noted that ease of use not only improves satisfaction but also affects behavioural outcomes like trust and continued usage (Amin, 2016). Yoon (2010) confirmed that perceived ease of use shapes how customers assess digital service quality. Therefore, literature consistently supports the notion that ease of use is a critical driver of customer satisfaction in digital banking environments.

Hence, this study hypothesizes that:

H1: *Ease of Use of DBS significantly influences customer satisfaction.*

Efficiency and DBS Customer Satisfaction: Efficiency in digital banking refers to the system's ability to process transactions swiftly, minimize user effort, and deliver seamless service (Parasuraman et al., 2005; Agu et al., 2024). It embodies the system's ability to deliver timely, reliable, and user-centric financial services (Ariff et al., 2013). More than a technical metric, efficiency shapes user perceptions by reducing transaction time, minimizing effort, and maximizing convenience. Studies by Famiyeh et al. (2018) and John and Rotimi (2014) emphasize that efficiency in service delivery is not only operationally strategic but also pivotal for fostering customer satisfaction.

Empirical evidence consistently highlights efficiency as a cornerstone of customer satisfaction in digital financial services. For instance, Ariff et al. (2013) demonstrated that faster transaction processing and reduced input requirements directly enhance user satisfaction by lowering cognitive load and frustration. This relationship is echoed in broader e-banking literature, where efficiency is consistently linked to enhanced customer experience and loyalty (Amin, 2016; Raza et al., 2020). Thus, efficiency emerges as a core determinant of digital service quality that reinforces positive user evaluations, satisfaction, and repeat usage.

Hence, this study hypothesizes that:

H2: *The Efficiency of DBS significantly influences customer satisfaction.*

Interoperability and DBS Customer Satisfaction: Interoperability refers to the capacity of a digital banking application to connect, communicate, and operate across diverse electronic banking systems (Gupta et al., 2017). As banks integrate services with mobile money, fintech, and other banking infrastructures, interoperability has emerged as a critical component of digital service quality. Without interoperability, financial systems remain isolated, impeding the free flow of data and user mobility (Wu, 2006). Wu's (2006) assertion that interoperability is a competitive differentiator, as it transforms banking from a siloed experience into an ecosystem of integrated financial services.

Interoperability reduces transaction friction and switching costs, allowing customers to perform similar tasks across channels without disruption (Bourreau & Valetti, 2015). This functionality directly contributes to perceived convenience and service efficiency, core drivers of satisfaction. It satisfies modern banking customers' demand for seamless omnichannel experiences, reducing cognitive load and fostering satisfaction. Moreover, in an increasingly interconnected financial ecosystem, interoperability is a strategic asset.

Hence, this study hypothesizes that:

H3: *The Interoperability of the DBS application significantly influences customer satisfaction.*

Privacy/Security and DBS Customer Satisfaction: Privacy/Security refer to the extent to which a digital banking platform safeguards customers' personal and financial data (Parasuraman et al., 2005). Key attributes include data integrity, confidentiality, authenticity, and non-repudiation (Aboobucker & Bao, 2018). In an environment where digital threats are rising, robust privacy and security features are not merely technical necessities, they are foundational to customer trust and satisfaction.

Studies have shown that customers are more likely to engage with digital banking platforms they perceive as secure (Mujinga, 2020). Security mechanisms such as encryption, authentication, and fraud detection enhance perceived reliability, which in turn fosters trust and emotional assurance. Ketema (2020) demonstrated that security was a dominant factor in shaping customer perceptions of service quality, significantly influencing satisfaction and retention. Privacy/security is not merely a feature but a prerequisite for digital banking adoption; its absence triggers dissatisfaction, while its presence enables emotional and transactional

confidence (Liao et al., 2022). Thus, it becomes clear that when users feel confident in the protection of their information, they are more likely to express satisfaction, remain loyal, and recommend the service.

Hence, this study hypothesizes that:

H4: *Privacy/Security of the DBS application significantly influences customer satisfaction.*

Responsiveness and DBS Customer Satisfaction: Responsiveness, defined as the speed and willingness to resolve customer issues (Parasuraman et al., 2005), is a critical driver of satisfaction in digital banking. Akinyemi et al. (2010) emphasize that in digital environments, where human interaction is limited, prompt responses to queries or failures become the primary surrogate for service quality. Narteh (2018) demonstrates that banks with responsive digital platforms (e.g., chatbots resolving complaints within minutes) achieve 23% higher satisfaction rates than competitors. This aligns with Zavareh et al.'s (2012) "service recovery paradox," where customers who experience quick resolutions of digital failures report higher satisfaction than those who never encountered issues. Refoua and Rafaeli (2023) highlighted that responsiveness satisfies two psychological needs: competence (efficient problem-solving) and care (perceived attentiveness), both of which foster trust and satisfaction.

According to Zavareh et al. (2012), customers' perceptions of quality improve significantly when digital service issues are resolved promptly and professionally. Moreover, responsiveness not only reassures users during disruptions but also enhances trust and reliability perceptions. Thus, responsiveness in DBS is not just operational but emotional; it signals commitment to customer-centricity, directly elevating satisfaction.

Hence, this study hypothesizes that:

H5: *Responsiveness of DBS significantly influences customer satisfaction.*

DBS Customer Satisfaction and Customer Retention: Customer satisfaction, a holistic evaluation of service performance (Gustafsson et al., 2005), is the cornerstone of retention in digital banking. Empirical studies demonstrate that satisfied customers exhibit three times higher retention rates due to emotional and rational loyalty (Raza et al., 2020). Studies have consistently shown that satisfied customers are less likely to switch, more likely to remain loyal, and can contribute to long-term profitability (Hasan et al., 2013; Gazi et al., 2024). In addition, Edward and Sahadev (2011), satisfaction bridges service quality and retention through dual pathways, i.e., *a) affective loyalty- emotional attachment to seamless experience, and b) Cognitive loyalty- rational assessment of superior values.* Thus, satisfaction is the ultimate competitive moat; banks that prioritize DBS quality to delight customers will dominate retention metrics.

Hence, this study hypothesizes that:

H6: *The Quality DBS satisfaction significantly influences customer retention.*

Mediating Role of DBS Customer Satisfaction: Customer satisfaction serves as a critical link between service quality perceptions and customer retention in digital banking contexts. While individual dimensions such as ease of use, efficiency, interoperability, privacy/security, and responsiveness enhance the perceived quality of service, their influence on long-term customer behavior is often realized through the satisfaction they generate.

Satisfaction reflects customers' overall evaluation of their digital banking experience and directly influences their intention to remain with the service provider (Raza et al., 2020). When users find digital services convenient, secure, and responsive to their needs, they develop positive emotional and cognitive evaluations, which in turn strengthen retention intentions (Wang et al., 2019). This aligns with findings by Al-Ghraibah (2020), who confirms that satisfied customers are more likely to maintain relationships with a digital banking platform. Moreover, prior studies highlight that Borah et al. (2020) improved service delivery, when leading to satisfaction, significantly reduces customer churn and maximizes business outcomes. Therefore, it is posited that digital banking customer satisfaction transmits the effects of these service quality dimensions on retention.

Hence, this study hypothesizes that:

H7a: *DBS customer satisfaction mediates the relationship between ease of use and customer retention.*

H7b: *DBS customer satisfaction mediates the relationship between efficiency and customer retention.*

H7c: *DBS customer satisfaction mediates the relationship between interoperability and customer retention.*

H7d: *DBS customer satisfaction mediates the relationship between privacy/security and customer retention.*

H7e: *DBS customer satisfaction mediates the relationship between responsiveness and customer retention.*

Research Methods

The study aimed to examine causal relationships between DBSQ dimensions, customer satisfaction, and retention. An explanatory research design was employed. Aligned with the positivist paradigm, the study utilized a quantitative research approach to test a priori hypothesized relationships using Structural Equation Modelling (SEM).

Following Hox and Boeije (2005), the present study employed cross-sectional data for analysis. Data was gathered using an online survey questionnaire administered in the Kobo toolbox. A convenience sampling technique (i.e., non-probability sampling) was employed due to the unavailability of the sampling frame. Using Cochran's (1977) formula for an unknown population, the minimum sample size determined for the study was 385. The study focused on customers who regularly engaged with digital banking services in managing their financial activities.

The survey questionnaire was structured into two parts: the first part comprises respondents' demographic profile, and the second part consists of an assessment of research variables in the model. Similarly, before full-scale data collection, a pilot study of 30 participants was conducted following Nunnally's (1978) criteria. The finding revealed recorded internal consistency of the scale items and no issue of multicollinearity.

Based on an anticipated response rate of 60%, as recommended by Fowler (2013) and Baruch and Hultom (2008), a total of 642 (385/.60) questionnaires were distributed to obtain the desired sample size of 385 respondents. Data were collected from October to December 2024. Additionally, to prevent duplicate entries and missing data in the online format, restrictions were implemented in the Kobo Toolbox, with all questions set as mandatory. A total of 426 responses were received, yielding a response rate of 66.36%, which, according to Babbie (2020), is considered highly comprehensive for survey research.

The study adhered to established ethical research standards, ensuring informed consent, voluntary participation, and the confidentiality of respondents' data. Similarly, descriptive analysis was performed using SPSS version 23, while inferential analysis was conducted using SmartPLS 4.0. Given that the study employed well-established reflective constructs, the model was categorized as reflective. In line with Anderson and Gerbing's (1988), two-stage analytical approach, PLS-SEM was used to assess the measurement and structural models, evaluating the psychometric properties of the constructs.

The demographic distribution of the respondents (see Table A1) provides valuable insights into the diversity of digital banking users within Kathmandu Valley. In terms of gender, the sample comprised 217 male respondents (51%) and 209 female respondents (49%), indicating a nearly balanced representation across genders. A significant portion of respondents fell within the age group of 18-40 years (i.e., 45% + 34% = 80%), and 44% of the participants held a bachelor's degree.

Measures and Instruments

The research instrument employed in this study was derived from existing literature anchored on a five-point Likert scale (1: strongly disagree, 5: strongly agree). The variables employed to develop the research model (Figure 1) were adapted from empirically grounded literature. Out of five predictor variables, four (ease of use, efficiency, security/privacy, and responsiveness) were drawn from the E-S-QUAL (Parasuraman et al., 2005), and one (interoperability) from Gupta et al. (2017).

Table 2

Measurement Items

Constructs	Number of Observed Items	Adopted From
Ease of Use (EU)	5	(Parasuraman et al., 2005)
Efficiency (EFF)	4	(Parasuraman et al., 2005)
Interoperability (INTP)	3	(Gupta et al., 2017)
Privacy/Security (SEC)	5	(Parasuraman et al., 2005)
Responsiveness (RESP)	4	(Parasuraman et al., 2005)
Customer Satisfaction (CAST)	4	(Chang & Chen, 2009) (Gustafsson et al., 2005)
Customer Retention (CRR)	3	(Weinstein, 2002)

Results and Analysis

Preliminary Screening and Descriptive Analysis

Before data analysis, preliminary checks like KMO and Bartlett's Test, common method bias (CMB), and non-response bias were performed to ensure the data's representativeness. Firstly, KMO (0.844) and Bartlett's test ($p < 0.001$) confirmed items and sample adequacy, indicating the data's suitability for factor analysis.

Secondly, following Podsakoff et al. (2003), both procedural and statistical remedies were applied to address CMB. Procedurally, pilot testing ensured questionnaire clarity, and participant anonymity was maintained to reduce social desirability bias. Statistically, full collinearity and Harman's single-factor tests confirmed the absence of CMB, with VIF values below 3.33 and a single factor accounting for only 27.296% of the variance, well under the 50% threshold.

Thirdly, following Sedgwick's (2014) guidelines, non-response bias was assessed by comparing early and late respondents using an independent sample t-test. The analysis showed no significant differences in mean values ($p > 0.05$), indicating that non-response bias was not present in the study.

Table 3 presents the descriptive statistics of all seven variables in the study, with mean scores ranging from 3.97 to 4.23 and standard deviations (SD) between 0.83 and 1.30. Ease of Use and Efficiency had the highest means (4.23), indicating strong agreement and relatively low variability. Privacy/security and responsiveness also showed positive perceptions ($M = 4.09$), though with slightly higher response variation. Meanwhile, customer satisfaction had the lowest mean (3.97), and interoperability showed the highest variability ($SD = 1.30$), suggesting more mixed responses.

Furthermore, to provide contextual depth to the analysis, respondents were asked about their preferred digital banking access channels and usage frequency. The findings revealed that the mobile banking app emerged as the most frequently used channel (86.7%), followed by internet/online banking (81.7%). Additionally, QR payment services were used by 80.3% of respondents, and ATM access by 71.7%. In terms of usage frequency, 87.7% of respondents reported using digital banking services daily, and 12.3% used them 2–3 times a week, showing a high level of digital engagement among customers.

Measurement Model Assessment

The measurement model was evaluated through convergent and discriminant validity to ensure the reliability and validity of the study constructs. Convergent validity was examined using confirmatory factor analysis by analysing factor loadings, average variance extracted (AVE), and composite reliability (CR).

Based on the guidelines of Hair et al. (2021), 26 items across seven constructs were retained, as their factor loadings fell within the acceptable range of 0.40 to 0.70. Conversely, two items (EU_5 and EFF_4) were removed due to their loadings falling below the 0.40 threshold. Similarly, internal consistency was confirmed with Cronbach's Alpha (CA) and CR values exceeding 0.70, ensuring reliability (Cohen et al., 2017; Hair et al., 2017). Convergent validity (Fornell & Lacker, 1981) was confirmed with AVE values ranging from 0.689 to 0.776, surpassing the 0.50 threshold (see Table 3).

Furthermore, discriminant validity was validated using the Fornell-Larcker criterion, HTMT, and cross-loading tests, as suggested by Franke and Sarstedt (2019) and Hair et al. (2017). As presented in Table 4, the square root of each construct's AVE exceeded its correlations with other constructs, meeting the Fornell-Larcker standard. All HTMT values were below the 0.85 threshold, indicating clear distinctions between constructs (see Table 5). Lastly, all the indicators in the measurement model belonging to a specific construct loaded strongly into its parent construct, signifying no issue of cross-loading in the model.

Table 3

Evaluation of the Measurement Model

Construct	Items	Factor Loading	Mean	SD	AVE	CR	Cronbach's Alpha
Ease of Use	EU_1	0.888	4.23	0.83	0.719	0.911	0.87
	EU_2	0.834					
	EU_3	0.874					
	EU_4	0.792					
Efficiency	EFF_1	0.895	4.23	1.07	0.698	0.873	0.806
	EFF_2	0.716					
	EFF_3	0.884					

Interoperability	INTP_1	0.85	4.01	1.3	0.701	0.875	0.816
	INTP_2	0.738					
	INTP_3	0.915					
Privacy/ Security	SEC_1	0.922	4.09	1	0.808	0.955	0.941
	SEC_2	0.894					
	SEC_3	0.903					
	SEC_4	0.873					
	SEC_5	0.903					
Responsiveness	RESP_1	0.864	4.09	1.09	0.679	0.894	0.848
	RESP_2	0.81					
	RESP_3	0.875					
	RESP_4	0.738					
Customer Satisfaction	CSAT_1	0.932	3.97	1.07	0.834	0.952	0.933
	CSAT_2	0.905					
	CSAT_3	0.92					
	CSAT_4	0.894					
Customer Retention Intention	CRR_1	0.936	4.04	1.04	0.841	0.941	0.905
	CRR_2	0.886					
	CRR_3	0.928					

Table 4

Discriminant Validity - Fornell and Larcker Criterion

	CRR	**CSAT**	**EFF**	**EU**	**INTP**	**RESP**	**SEC**
CRR	0.817						
CSAT	0.639	0.813					
EFF	0.344	0.239	0.836				
EU	0.381	0.41	0.307	0.848			
INTP	0.163	0.098	0.295	0.228	0.837		
RESP	0.178	0.192	0.346	0.304	0.179	0.824	
SEC	0.255	0.26	0.297	0.306	0.25	0.31	0.849

Table 5

Discriminant Validity - HTMT

	CRR	CSAT	EFF	EU	INTP	RESP	SEC
CRR							
CSAT	0.691						
EFF	0.378	0.233					
EU	0.427	0.45	0.341				
INTP	0.167	0.088	0.366	0.252			
RESP	0.195	0.2	0.421	0.349	0.214		
SEC	0.273	0.271	0.328	0.337	0.26	0.328	

Structural Model Assessment

After analysing the measurement model, the structural model was assessed using the bootstrapping technique with a resample of 10,000. This analysis primarily focused on testing the proposed hypotheses. Initially, five key tests were conducted: collinearity analysis, coefficient of determination (R^2), effect size (f^2), PLS-predict, and model fit. Following these evaluations, the hypothesis testing was performed.

It is essential to assess collinearity before examining structural relationships, as it can distort regression outcomes. For a reflective model, collinearity within the inner model (i.e., among predictor variables) should be checked. According to Hair et al. (2021), a VIF value exceeding five suggests potential collinearity issues, whereas a value below 3 indicates an optimal condition. In this study, all latent construct VIF values were found to be below 3, confirming the absence of collinearity among predictors. Given the absence of collinearity, subsequent calculations for R^2, effect size, and PLS-Predict were carried out.

The model's predictive power was assessed using R^2, where values of 0.75, 0.50, and 0.25 indicate substantial, moderate, and weak predictive strength, respectively. Table 6 shows that the R^2 value of CRR is 40.8%, indicating closer to the moderate predictive power, whereas for CSAT it is 19.8%, indicating weak predictive power.

To evaluate the relative impact of each DBSQ dimension on customer satisfaction and customer retention, the study computed Cohen's effect sizes (Cohen et al., 2017). The f^2 values were interpreted using Cohen's thresholds: 0.02 (small), 0.15 (medium), and 0.35 (large). The findings revealed that all the f^2 values exceed 0.02, demonstrating the presence of an effect of all the exogenous variables.

Similarly, cross-validated redundancy (Q^2) was employed to assess the predictive relevance of the latent variables. As per Henseler et al. (2015), a Q^2 value above zero confirms the model's predictive capability. The results showed Q^2 values of 0.543 for CRR and 0.341 for CSAT, both exceeding zero, thus demonstrating the model's predictive relevance.

Although PLS-SEM traditionally does not emphasize model fit indices (Hair et al., 2023), recent scholars like Schuberth et al. (2022) highlight their importance. To assess model fit, SRMR and NFI were employed as recommended metrics. The Standardized Root Mean Square Residual (SRMR) value of 0.052 (below the 0.08 threshold) and Normed Fit Index (NFI) value of 0.742 indicate a satisfactory model fit.

Table 6

Predictive Relevancy

Predictors	Outcome Variable	R-Square	f- Square	Q-Square
EU	CRR	0.408	0.197	CRR= 0.543
EFF			0.143	CSAT= 0.341
INTP			0.021	Model Fit (SRMR: 0.052; NFI: 0.742)
RESP			0.034	
SEC			0.114	
CSAT			0.296	
EU	CSAT	0.198	0.213	
EFF			0.168	
INTP			0.021	
RESP			0.034	
SEC			0.123	

The hypothesis validation is established through the analysis of b-values, standard error (SD), and *p*-values. The acceptance criteria are met when $p < 0.05$ and $t > 1.645$. The relationships among variables are confirmed by Figure 2 and Tables 7, demonstrating both direct and indirect effects on customer retention. The results further support the discussion on the structural path's direct and indirect influences.

Table 7, EU significantly impacts CSAT (i.e., $\beta = 0.344$, $p<0.01$), confirming H1. Similarly, H2 shows the significant impact of EFF on CSAT (i.e., $\beta = 0.101$, $p<0.05$), confirming H2. In contrast, H3 and H5 were not supported (i.e., $\beta = 0.129$, $p = 0.354$ and $\beta = 0.021$, $p = 0.634$), respectively, which signifies that the relationship between INTP and CSAT, as well as RESP and CSAT, is not statistically significant. On the other hand, Privacy/Security (i.e., $\beta = 0.344$, $p<0.01$) and Customer Retention Intention (i.e., $\beta = 0.344$, $p<0.01$) demonstrated the most substantial influence on Customer Satisfaction related to banking.

Figure 2
Graphical Representation of the Structural Relationship

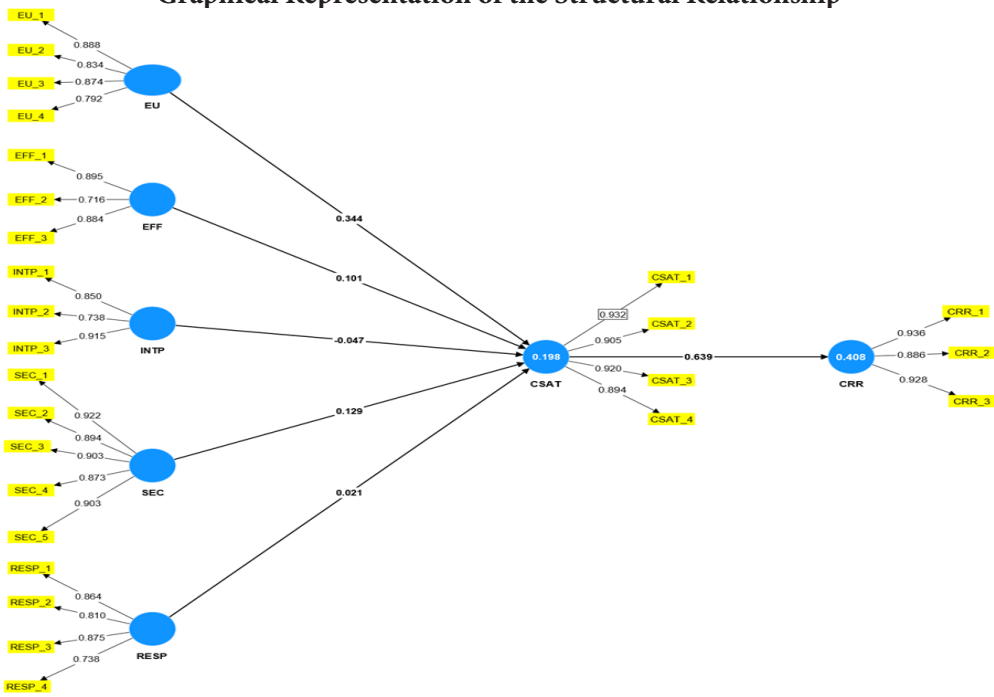

Table 7
Structural Model Result

Structural Path	Beta (β)	Mean Value	SD	t-value	p-values	Empirical Decisions
Direct Paths						
H1: EU -> CSAT	0.344	0.339	0.061	5.61	0.000	Supported
H2: EFF-> CSAT	0.101	0.105	0.045	2.247	0.025	Supported
H3: INTP-> CSAT	-0.047	-0.028	0.05	0.928	0.354	Not Supported
H4: SEC-> CSAT	0.129	0.128	0.055	2.356	0.019	Supported
H5: RESP -> CSAT	0.021	0.024	0.044	0.476	0.634	Not Supported
H6: CSAT-> CRR	0.639	0.64	0.046	13.97	0.000	Supported
Indirect Paths						
H7a: EU -> CSAT -> CRR	0.22	0.217	0.044	5.031	0.000	Supported
H7b: EFF -> CSAT -> CRR	0.065	0.067	0.03	2.175	0.03	Supported
H7c: INTP-> CSAT -> CRR	-0.03	-0.018	0.029	0.934	0.35	Not Supported
H7d: SEC -> CSAT -> CRR	0.083	0.081	0.035	2.355	0.019	Supported
H7e: RESP -> CSAT -> CRR	0.013	0.015	0.029	0.47	0.638	Not Supported

This study also examined the mediating effects of CSAT in the relationship between five predictor variables (EU, EFF, INTP, SEC, RESP) and CRR. The findings revealed that H7a: CSAT mediated the relationship of EU and CRR (i.e., $\beta = 0.22$, $p<0.01$). Likewise, CSAT mediated the relationship of EFF and CRR (i.e., $\beta = 0.065$, $p<0.05$). In contrast, the mediating effect in the relationship between INTP and CSAT (H7c) was not supported (i.e., $\beta = -0.03$, $p = 0.35$). Furthermore, CSAT also significantly mediated the relationship of Privacy/Security and Customer Retention Intention (i.e., $\beta = 0.083$, $p<0.05$). On the other hand, there was no mediating effect of CSAT between RESP and CRR (i.e., $\beta = 0.013$, $p = 0.638$). Hence, the mediating effect of CSAT was established in three predictor variables (i.e., EU, EEF, and SEC).

Discussions

This study aimed to examine the influence of DBSQ on CSAT and, subsequently, CRR in Nepalese commercial banks within Kathmandu Valley. Grounded in the E-S-QUAL model (Parasuraman et al., 2005), the findings reveal significant insights into the role of digital service quality in fostering customer retention through satisfaction.

The significant relationship between EU and CSAT aligns with prior literature emphasizing usability as a key antecedent to digital satisfaction (Zhou, 2011). In the context of digital banking, a user-friendly interface reduces cognitive effort, facilitates learning, and builds trust, all of which drive customer contentment (Mbama et al., 2018). Our findings reinforce the Technology Acceptance Model (TAM), which identifies perceived ease of use as a critical determinant of user acceptance and satisfaction (Davis, 1989). This is further supported by the significant indirect effect of the EU on CRR through CSAT, indicating that a user-friendly system promotes retention through increased satisfaction. Hence, banks should prioritize interface design and user guidance tools to improve the digital experience.

EFF also showed a significant positive influence on CSAT and indirectly influenced CRR via CSAT, aligning past studies of Rahi et al. (2019), where prompt services, minimal transaction times, and uninterrupted access were valued by digital users. This result is consistent with the core proposition of the E-S-QUAL model, where efficiency stands as a foundational pillar of electronic service quality (Stamenkov & Dika, 2015). In addition, the mediating role of CSAT in the EFF–CRR relationship emphasizes that timely and smooth execution of transactions does not directly ensure retention but works through the psychological satisfaction of users.

Contrarily, INTP and RESP did not significantly affect CSAT or CRR, either directly or indirectly. The non-significance of INTP suggests that customers may not yet perceive integration across systems (e.g., cross-platform or inter-bank operability) as a direct contributor to their satisfaction. This contrasts with studies in technologically mature contexts, where INTP is often critical. One explanation could be that the current digital banking ecosystem in Nepal has not yet fully operationalized seamless INTP, limiting users' expectations in this regard. Similarly, the insignificant impact of RESP might stem from response mechanisms (like chatbots or email support) still being underdeveloped in Nepalese banking, leading customers to rely more on in-branch or telephone support (Madhura & Panakaje, 2023).

Thus, it is evident that when certain services are not fully institutionalized or expected by customers, their influence on satisfaction and retention remains muted.

SEC showed a significant positive effect on CSAT and an indirect effect on CRR via CSAT. This reinforces the premise that trust and safety are integral to digital banking success, a finding consistent with prior works by Lee (2009), Chang (2024), and Ryu and Ko (2020). In developing economies, customers often harbour concerns about cyber threats and data misuse. As such, the E-S-QUAL dimension of SEC takes on heightened importance in shaping perceived value. In addition, even if technical security systems operate effectively in the background, proactively communicating these safeguards can enhance customer confidence, satisfaction, and retention. The significant mediated relationship highlights that perceived security doesn't just reassure, it actively translates into deeper satisfaction and behavioral loyalty. Therefore, commercial banks should not only invest in cybersecurity infrastructure but also build transparent and educational communication campaigns around digital safety practices.

Conclusion and Implications

The study highlights the evolving role of digital banking experiences in shaping customer behaviour, signalling a transformative shift in service quality paradigms within emerging markets. This study highlights that EUU, EFF, and SEC are critical DBSQ dimensions that significantly enhance customer satisfaction, which, in turn, strongly predicts customer retention in Nepalese commercial banks. Conversely, the insignificance of INTP and RESP highlights the contextual maturity, expectations of users, and peripheral concerns. Customer satisfaction emerged as a dominant psychological mechanism through which digital service quality affects long-term customer loyalty. Thus, the findings highlight that digital banking success in transitional economies requires prioritizing basic usability and trust-building over technological sophistication.

- The study reinforces and extends the E-S-QUAL framework by confirming the mediating role of CSAT between DBSQ dimensions and CRR, validating it in the context of an emerging digital economy.
- It contributes to the TAM by reaffirming that perceived ease of use is not only central to user acceptance but also foundational in developing customer loyalty through satisfaction.
- The study empirically confirms that DBS dimensions such as EU, EFF, and SEC, significantly influence customer satisfaction and retention, adding to existing literature on service quality in digital banking.
- The insignificant effects of INTP and RESP challenge assumptions of universal applicability of service quality constructs, indicating the need for contextualized theories suited for developing economies' digital ecosystems.

- Banks can leverage DBS quality dimensions, EU, EFF, and SEC, as cost-effective strategies to improve customer satisfaction and enhance retention rates.
- The findings equip banks and financial institutions (BFIs) with customer-preference-based metrics for tailoring digital services, supporting better strategic decisions to achieve operational excellence and competitive advantage.
- The study provides actionable insights for banks to design user-friendly and secure digital platforms that cater to varying user competencies, helping mitigate cyber threats and improve user trust and retention.
- Regulators and policymakers should encourage the standardization and implementation of interoperable banking platforms to elevate digital expectations and facilitate seamless user experiences across systems.

Limitations and Further Research

Future research could enhance this model by integrating additional psychological or behavioural constructs, such as trust, perceived value, or digital literacy, as moderating variables to capture individual differences in digital banking experiences better. Similarly, researchers may also consider employing alternative theoretical lenses, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) or Expectation-Confirmation Theory (ECT), to deepen their understanding of user satisfaction and retention mechanisms. Furthermore, this model could be replicated among rural populations to uncover context-specific dynamics of digital service quality.

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Conflict of Interest

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Juna Lama: Conceptualization, Methodology, Data Collection, Data Analysis, Writing-Original Draft, Review and Editing, Visualization, Resources, and Investigation.

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Annex

Table AI

Socio-Demographic Profile

Variable	Category	Frequency	Percentage (%)
Gender	Male	217	51
	Female	209	49
Age Group	18-30	192	45
	31-40	148	35
	41-50	86	20
Education Level	High School (Plus 2)	107	25
	Bachelor's Degree	186	44
	Masters and above	114	27
	Others	19	4

Bios

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