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Web-based Banking Services on E-Customer Satisfaction in Private Banking Sectors: A Cross-Sectional Study in Developing Economy

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Abstract

The study intends to determine the web-based banking services that are impacting electronic customer satisfaction by the private banks in Bangladesh. Moreover, the study investigates the correlation between demographic information and web-based banking service quality and electronic customer satisfaction levels in Bangladeshi private banks. IBM SPSS Statistics 29.0 is used by researchers for analyzing the demographic values of the respondents. Conceptual research model analyzed by SmartPLS 4.0. The value of r square found in this study is 0.350, which indicates 35% of the variation in the outcome from independent variable to ECS. Assurance, e-learning, and service quality have a significant impact on achieving e-customer satisfaction in the private sector banks in Bangladesh that are supported by H1, H3, and H4. Bangladeshi private banking policymakers should introduce user-friendly and promising offerings to attract customers for faster adoption of web-based banking services by facilitating low-cost leadership, strong security, literacy, and awareness.

Keywords: *Web-based Banking, Service Quality, Assurance, Electronic Customer Satisfaction, E-learning, Private Banking Sector, Bangladesh.*

1. Introduction

The private banking sectors have seen a substantial transition in the present digital era as a result of technological improvements in Bangladesh (Siddiquee, 2016). One of the most significant advancements is the rise of web-based banking services, which have fundamentally transformed the manner in which clients engage with financial institutions (Liu, 2022). Web-based banking services provide clients with the ease of conducting financial transactions and accessing banking services remotely, regardless of their location or time constraints (Siddik, 2016). These services offer a diverse variety of functions that enhance accessibility and help customers to manage their finances effectively (Fathi, 2022). Consequently, there has been a growing prevalence in the

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uptake and use of web-based financial services by clients, resulting in a notable change in customer expectations and satisfaction (Raza et al., 2020).

The private banking market in Bangladesh has experienced significant expansion and fierce rivalry. Private financial institutions have acknowledged the significance of online banking services as a strategic instrument for the purpose of attracting and retaining consumers within the constantly evolving market (Phan et al., 2016). Nevertheless, the efficacy of these services ultimately hinges on the degree of client happiness and the banks' capacity to fulfill customers' ever-changing demands and preferences.

The comprehension of e-customer satisfaction regarding web-based financial services in the private banking sectors of Bangladesh holds significant significance for scholars and practitioners (Khan et al., 2022). Conducting research in this domain may provide valuable insights into the determinants of e-customer satisfaction, therefore allowing banks to devise efficacious methods for augmenting their online banking services and attaining a competitive edge (Khatoon et al., 2020).

Furthermore, the advent of the technological revolution in web-based banking has empowered customers to increasingly choose online financial services (Alam et al., 2022; Fathi, 2022). However, there are a significant number of customers who are not entirely satisfied with the experience of acquiring online services (Bielski, 2003). Hence, it is imperative to comprehend customer perceptions regarding various aspects of web-based banking services that have significantly influenced the upward trajectory of electronic customer satisfaction (Raza et al., 2020). The degree of happiness that consumers have when using electronic or online platforms, including webpages, mobile apps, or digital services, is referred to as electronic customer satisfaction (Bhuiyan et al., 2023). It gauges the degree to which clients' expectations are satisfied or surpassed during virtual exchanges with a business or institution (Siddik, 2016).

Furthermore, customers perceive web-based banking as a more convenient option due to its ability to facilitate financial transactions and provide various banking services remotely, all at an accelerated rate (Siddik, 2016). The most recent advancements in the private banking sector encompass the integration of web-based banking services, which afford customers the opportunity to harness enhanced flexibility, convenient access to information, superior service quality, assurance reliability at minimum costs, and numerous other benefits (Bielski, 2003).

However, a significant number of users exhibit a reluctance to fully utilize and optimize the innovative services offered by electronic banking, thereby necessitating the need for increased attention and awareness (Bhuiyan, 2017; Raza et al., 2020).

This research study is a valuable contribution to the existing body of literature on private banking sectors and academia. It elucidates the role of web-based banking service quality factors in predicting electronic customer satisfaction. This study has identified five primary aspects of web-based banking service quality, including assurance, security, e-learning, service quality, and dependability, which have been determined to be the essential variables that significantly impact ECS.

1. To evaluate the degree of e-customer satisfaction pertaining to web-based banking services offered by private banks in Bangladesh.

2. To identify the key services of web-based banking that significantly impacted electronic customer satisfaction levels.

3. To determine client demographics—age, gender, education level, income level, employment, web-based banking service experience, website experience, and internet device—by finding the association between e-consumer satisfaction and web-based banking services.

2. Conceptualisation and Development of Constructs

2.1. Web-Based Banking Services

According to Rahi et al. (2019), web-based banking is a banking service that addresses the constraints of physical presence in a specific location by leveraging electronic devices. Web-based banking refers to the utilization of internet technology to facilitate traditional banking services and expedite resource transfers within the banking system (Fathi, 2022). Internet banking or web-based banking can be conceptualized as a technological process that leverages advanced network technology and communication systems to facilitate traditional banking operations, thereby eliminating the need for customers to be physically present (Li et al., 2021; Alam et al., 2022). According to Candelore et al. (2016), the integration of the banking process, which involves data networking and data transactions, is significantly influenced by various digital devices that are embedded in personal computers, smartphones, ATM booths, and points of sale.

2.2 Assurance

Assurance refers to the providing of security and trustworthiness by a corporation to its consumers (Lynn et al., 2021). In the realm of e-commerce, it is widely recognized that the primary hindrance to its expansion is in the domain of security and privacy inside the online environment (Hou et al., 2018). The issue of security is of great sensitivity in the realm of online services, since clients place a high value on their privacy (Raza et al., 2020). This dimension encompasses security aspects that are integrated into the purchasing process, ensuring confidentiality and effectively engaging with consumers (Lee et al., 2021). The utilization of online platforms is of utmost importance in the digital landscape, as seen by its widespread application in various research projects conducted in online contexts (Siddik, 2016; Islam & Bhuiyan, 2022). In summary, the primary aim of this dimension is to ensure the provision of security and confidentiality measures for clients (Meslier et al., 2022).

2.3 Security (SE)

Lee (2009) suggests that security is perceived as the degree to which consumers have confidence in the website's protection against unauthorized access by hackers and third parties, as well as its ability to minimize the risk of financial loss resulting from transaction or server errors (Cornelli et al., 2023; Bhuiyan et al., 2023). Customer trust refers to the extent to which individuals perceive a lack of risk and uncertainty in their interactions with a particular entity. It encompasses the implementation of a comprehensive system that safeguards the security and confidentiality of customers' transactions and personal data. The implementation of security as a service has resulted in a shift away from the local provision of security solutions (Hou et al., 2018). Previously, the IT department would install various security tools, such as virus protection software and spam filtering software, on individual machines as well as on the company network and server (Wu & Shen, 2019). The banking industry is currently grappling with issues of data security and privacy due to the emergence and implementation of advanced technology (Koomson et al., 2023). Additionally, they would be responsible for ensuring that the software remained updated and providing instructions to users on its usage.

2.4 E-learning (EL)

Technological advancements have had a significant impact on the learning process for both individuals and businesses (Dominici & Palumbo, 2013; Li et al., 2021). Current learners are being introduced to digital alternatives for traditional learning and training systems, which are now being incorporated into the context of traditional education. Tan et al. (2015) argue that the proliferation of advanced technology and digital tools has facilitated the adoption of flexible remote learning, allowing individuals to engage in educational activities at their convenience. E-learning, also known as online learning, has gained widespread recognition as an effective method of providing individuals with on-

demand learning opportunities while also addressing the disparities between requirements and expectations on an international scale (Murillo & Velazquez, 2008; Wang et al., 2007). E-learning refers to the process through which individuals acquire knowledge, employing various tools and methods, as observed by Dominici and Palumbo (2013). According to the Islam and Bhuiyan (2022), e-learning is characterized by its ability to facilitate users acquisition of specific knowledge and information through online platforms, distinguishing it from both ubiquitous learning and distance learning. E-learning is a recognized phenomenon that has emerged due to the increasing prominence of learning, facilitated by the adoption of advanced technology and the internet. This development has created opportunities for individuals to access resources and services, enabling remote collaboration and communication (Alptekin&Karsak, 2011).

2.5 Service Quality (SQ)

Service quality refers to the extent to which a specific application provides customers with effective execution, accessibility, and reliability (Alzoubi et al., 2020). Li et al. (2021) assert that service quality serves as a mechanism for narrowing the disparity between customers' perceptions of service quality and their desired expectations. Sathiyavany&Shivany (2018) identified three dimensions of e-banking service quality: cost-effectiveness, user friendliness, and technical support. Hence, the service quality of electronic banking facilities refers to the extent to which a bank's services can be differentiated based on their suitability, availability, user friendliness, and dependability.

2.6 Reliability

The concept of reliability pertains to the capacity to consistently and accurately provide the promised service. This encompasses various aspects such as the frequency of website updates, timely responses to customer inquiries, the precision of online purchasing and billing processes, prompt delivery of goods, and the maintenance of personal information security (DeYoung et al., 2007).

The dimension of reliability is considered a primary component of e-service quality and pertains to the consistent as well as dependable supply of website design (Li et al., 2021; Khanom et al., 2022). According to Sathiyavany and Shivany (2018), the reliability of aweb-based banking services may be determined by its adherence to delivering the promised service, ensuring the continuous availability of its website, and maintaining its functionality. In more concise language, user trust in a bank's online service pertains to their confidence in the service's ability to fulfill its commitments and maintain website updates. Hence, the pleasure of a website user is influenced by the level of dependability (Pellegrini et al.,2022).

2.7 E-Customer satisfaction (ECS)

In terms of web-based banking quality, e-satisfaction refers to the level of contentment experienced by users in relation to their past interactions or transactions with a certain financial institution (Khan et al., 2022; Khatoon et al., 2020). Furthermore, there is expected to be a strong correlation between ECS and service quality (Lynn et al., 2021). Raza et al. (2020), who put forth the theory that the achievement of improved quality is heavily dependent upon user satisfaction, have established the relationship in question. Khatoon et al. (2020) posit that customer satisfaction or fulfillment from the perspective of web-based banking refers to the evaluation of the extent to which the services offered by Internet banks have aligned with consumer expectations. According to Raza et al. (2020), the ability to provide high-quality service to consumers plays a crucial role in establishing a positive reputation, expanding the user base, and attracting new potential customers to the banking website of a cyberbank. Therefore, the provision of high-quality service enhances the level of consumer happiness.

In their study, Raza et al. (2018) conducted an analysis of many factors, including economic, social, psychological, and physical variables, in order to evaluate satisfaction.

Satisfaction, in this context, is seen as a measure of the value and quality of consumable goods and services, which might vary across different consumer groups. The level of satisfaction is contingent upon the extent to which the core attributes of a service, which may encompass aspects of mysticism or irrationality, augment the consumer's overall experience. The perception of customers based on their insights and consumption is influenced by several factors, including their cognitive abilities, social background, knowledge, and skills (Khan et al., 2022; Khatoon et al., 2020). The measure of customer satisfaction serves as a crucial metric for evaluating the capacity of a bank's online application to effectively maintain, attract, and enhance profit margins. According to Khatoon et al. (2020), the utilization of contemporary IT infrastructure in service delivery, along with the implementation of Activity Based Costing, has been found to result in consistent profitability while simultaneously cutting expenses for both customers and banks. In order to sustain client happiness, financial institutions are required to enhance perceived quality by delivering exceptional service (Raza et al., 2020).

3. Development of Hypothesis

3.1 Assurance and E-Customer Satisfaction

Assurance is a significant aspect of the assessment of client satisfaction within the service business. The job of assurance is of great importance in the determination of electronic consumer satisfaction. In their study, Pellegrini et al. (2022) investigated the impact of electronic customer awareness on satisfaction with e-banking services. The findings of their research indicate that the utilization of internet banking leads to a reduction in the time required to conduct business activities (Di & Pattison, 2023), alleviates congestion in physical banking facilities, and enhances the efficiency of the money transfer process (Borokhovich et al., 2011). Nevertheless, the research underscored that despite the numerous advantages of this banking technique, there are certain inherent drawbacks. Of particular importance is the issue of security, which, if addressed effectively, may enhance ECS and further encourage the use of Web services on a larger scale (Lee et al., 2021).

According to Borokhovich et al. (2011), their study reveals that e-banking has emerged as an essential tool for survival and is significantly transforming the global banking industry. Furthermore, the authors note that e-banking has revolutionized the manner in which banking services are provided to clients (Bhuiyan, 2023). Moreover, it is emphasized that e-banking services exhibit decreased operational expenses, enhanced customer service provision, customer retention, diminished branch congestion, and reduced branch personnel. According to Borokhovich et al. (2013), there is a growing trend of popularity for e-banking services across the country. The number of e-banking clients is expanding due to the convenience it offers, in keeping with the digital lifestyle of citizens.

H1: Assurance (AR) of web-based banking services has a positive impact on ECS.

3.2 Security and ECS

Hua (2009) found that security is more important than convenience in electronic web-based banking satisfaction. Web-based banking usage is driven by security, suggesting satisfaction. Hackers are using users' credentials to access their accounts and commit financial crimes as e-banking grows. The paper suggested banks get a competitive edge by protecting internet transactions first. The article claimed most banks use security indicators (SI) to inform and decrease stress. Security service promotes e-banking consumer confidence, which leads to advanced loyalty from new and old clients, which raises customer retention and profit margin.

Clients choose financial institutions based on security, secrecy, and fund protection. Li et al. (2021) noted that banking security factors like privacy, integrity, and digital signature

affect customer satisfaction. The author defines privacy as an organization's data protection. Information should not be modified without client consent. Digital signatures also prevent data fraud. E-banking infrastructure that protects customers' interests boosts customer acceptance (Abdillah & Suharjito, 2019). Mousa et al. (2021) quantified customer approval of e-banking using the technology acceptance model (TAM). Bank website security, reliability, and safety obtained the highest consumer ratings, demonstrating the importance of security in customer delight.

H2: The Security (SE) of web-based banking services has a positive impact on ECS.

3.3 E-learning and ECS

E-learning is affecting industries beyond education exponentially. Service providers understand the far-reaching effects of e-learning and design new interfaces and apps to satisfy customers (Dominici & Palumbo, 2013: Bhuiyan, 2017). The author also noted that e-learning is now used for customer and employee training. The author noted e-learning's benefits for mobility and ease. The rise of huge corporations embracing e-learning systems for corporate training shows that this kind of learning is not confined to education. Multinational firms use e-learning tools to customize training programs to improve employee performance. Analyzing financial organizations' e-learning uptake and client happiness E-learning dimensions' system availability, flexibility, and skill utilization are closely associated with banking customer happiness, according to Li et al. (2021). Some e-learning opposing opinions must be mentioned. A theoretical model of e-learning satisfaction shows that organizational factors (training, technical, and management) and learning factors (perceived usefulness, flexibility, and interaction) influence satisfaction. This study showed that associated factor growth improves satisfaction.

H3: The E-learning of web-based banking services has a positive impact on ECS.

3.4 Service Quality and ECS

Service quality involves application performance, accessibility, and reliability (Alzoubi et al., 2020). Customer satisfaction strongly correlates with e-banking service excellence. Faster delivery of high-quality services boosts customer satisfaction. Li et al. (2021) found that customer satisfaction rises when incarnated service quality exceeds supposition and falls otherwise. Client retention depends on electronic service quality. The author noted that user-friendly e-banking attracts repeat visitors. Ayo et al. (2016) found that dependability, responsiveness, service availability, competence, service portion, and privacy greatly influence consumer attitude and satisfaction with Nigerian e-banking services. The researcher defined service quality as site design, timely and reliable service, communication, and trustworthiness. The parameters and customers' online service quality perceptions were substantially associated. The study identified 11 e-service quality elements that affect user satisfaction: the accessibility of navigation, the level of efficiency, the degree of dependability, the extent of personalization, the level of security, the responsiveness of the system, an appealing website, and price information.

H4: The Service Quality (SQ) of web-based banking serviceshas a positive impact onECS.

3.5 Reliability (REL) and ECS

Reliability refers to the capacity to consistently and accurately accomplish a predetermined objective. Raza et al. (2020) assert that banks have established a reputation for their consistency and reliability in executing web-based banking operations. Nevertheless, it is crucial to effectively demonstrate this dependability in the context of web-based services (Bhuiyan, 2019, 2023). According to Sathiyavany and Shivany (2018), it was asserted in their study that the dependability of online tasks might enhance user engagement with the service and encourage repeat usage. Raza et al. (2020) reported

that the HSBC cyber bank site had a cyberattack, leading to significant user dissatisfaction. Hence, the aforementioned elements pertaining to protection and secrecy are considered to be secure.

According to Bauer and Hein (2006), prior to utilizing any service offered by an online source, web-based banking customers must ensure that the source is safe, reliable, and guarantees the confidentiality of their personal data. Cheng and Chan (2009) argue that the utilization of web-based banking requires the transmission of sensitive and secret information. Consequently, it is crucial for the bank's website to possess qualities of reliability, trustworthiness, and security. Hence, the inclusion of this feature is considered a crucial variable in this research, aimed at examining the impact of web-based banking on ECS and customer loyalty. Existing literature indicates a robust and statistically significant correlation between dependability and ECS, as evidenced by the findings of Raza et al. (2020) and Sathiyavany and Shivany (2018).

H5: The Reliability (REL) of web-based banking services has a positive impact on ECS.

Figure 1: Conceptual Framework

4. Research Methodology

Statistical population

The population under study in this analysis comprises clients of web-based banking services in Bangladesh. The statistical population may vary in size, either being large or small, depending on the number of things or individuals under observation (Khanom et al., 2022). In order to optimize efficiency and resource allocation, it is possible to select and study a representative sample of community members instead of doing research on the entire population (Ullah et al., 2023). This approach allows for the preservation of time, human resources, expenses, and other administrative considerations.

Sample Size

A sample refers to a subset of a community wherein the individuals included are integral members of the main community (Vogl, 2023). In order to account for the vastness of the statistical population, a random sample of 500 individuals was chosen. Following the distribution of the questionnaires, subsequent collection number was 407, and the removal of useless or incomplete responses were 23, finally a total of around 384

questionnaires were prepared for further study. The response rate of customers is 77 percent out of total respondents to web-based banking services.

Data Collection Tools and Methods

Data collection in Bangladesh was conducted using field methods, specifically through the use of hard-copy questionnaires and an online Google form. Questionnaires were employed as a means of data collection in order to ascertain the correlation between the variables under investigation (Bhuiyan, 2019, 2023). In order to examine the determinants of consumer satisfaction in the context of e-banking, the researchers employed questionnaires that were specifically designed for this study (Bhuiyan et al., 2023). The questionnaires consisted of a total of 34 questions, which encompassed four questions related to demographic information, 8 questions and 26 questions that aimed to identify various aspects impacting electronic customer satisfaction. The questions were presented based on the identified variables. In addition, a Likert scale consisting of five points (strongly agree, agree, neutral, disagree, strongly disagree) was employed in the administration of the questionnaires.

Validity and Reliability of Research Instruments

After carefully reviewing the questionnaires, ensuring their accurate design, and aiming to improve their reliability and validity, we sought the expertise of qualified professors to confirm their quality. Subsequently, the questionnaires were distributed to a sample of 500 customers for testing purposes. The Cronbach's alpha coefficient, Average Variance Extracted (AVE), and Composite reliability of the questionnaire were determined using Smart PLS 4.0 to enhance the validity and reliability of the measurements (Vogl, 2023).

This study's reliability measurement is conducted using Cronbach's alpha method and composite reliability. Cronbach's alpha is a widely accepted measure of reliability, where values exceeding 0.7 are considered to demonstrate acceptable levels of reliability. The AVE criterion illustrates the extent to which variables share mean variance with their respective indices. The designated critical value is 0.5. An AVE value greater than 0.5 indicates an acceptable level of variance (Bhuiyan et al., 2023). A Composite reliability number greater than 0.7 signifies robust internal dependability for the model.

The Cronbach's alpha coefficients for the independent variables, specifically assurance, security, e-learning, service quality, reliability and ECS, were found to be 0.805, 0.801, 0.696, 0.855, 0.918, and 0.826, respectively, for the dependent variable, electronic customer satisfaction. Moreover, a value equal or exceeding 0.7 signifies a high level of reliability (Akter et al., 2023). Furthermore, it is noteworthy that all variables exhibited a composite reliability equal or exceeding 0.7. The AVE (Average Variance Extracted) for the entire variables exceeded 0.5. The proposed model is deemed acceptable at the standard level based on the established criteria (Ullah et al., 2023).

Data analysis methods

Descriptive data analysis was employed to elucidate the outcomes of the statistical population, whereas inferential data analysis was employed to scrutinize and assess hypotheses. Furthermore, the examinations were conducted using the SMART-PLS 4.0. The program in question is a method that relies on components to assess the validity, reliability, and relationships between variables. The least-squares approach is commonly employed as a substitute for structural equation modeling. In this study, the data analysis was conducted using Smart PLS 4.0 (Akter et al., 2023). The analytical procedure was carried out in two distinct stages. The initial stage encompassed an assessment of reliability as well as an examination of convergent and discriminant validity, model reliability, and the questionnaire. The second stage of the study involves validating the overarching research hypothesis through the administration of software-based assessments. The current study employed Smart PLS 4.0 for data analysis. Consequently,

the IBM SPSS Statistics 29.0 was scrutinized and evaluated alongside the research hypothesis outcomes (Ullah et al., 2023).

5. Analysis and Findings of the Study

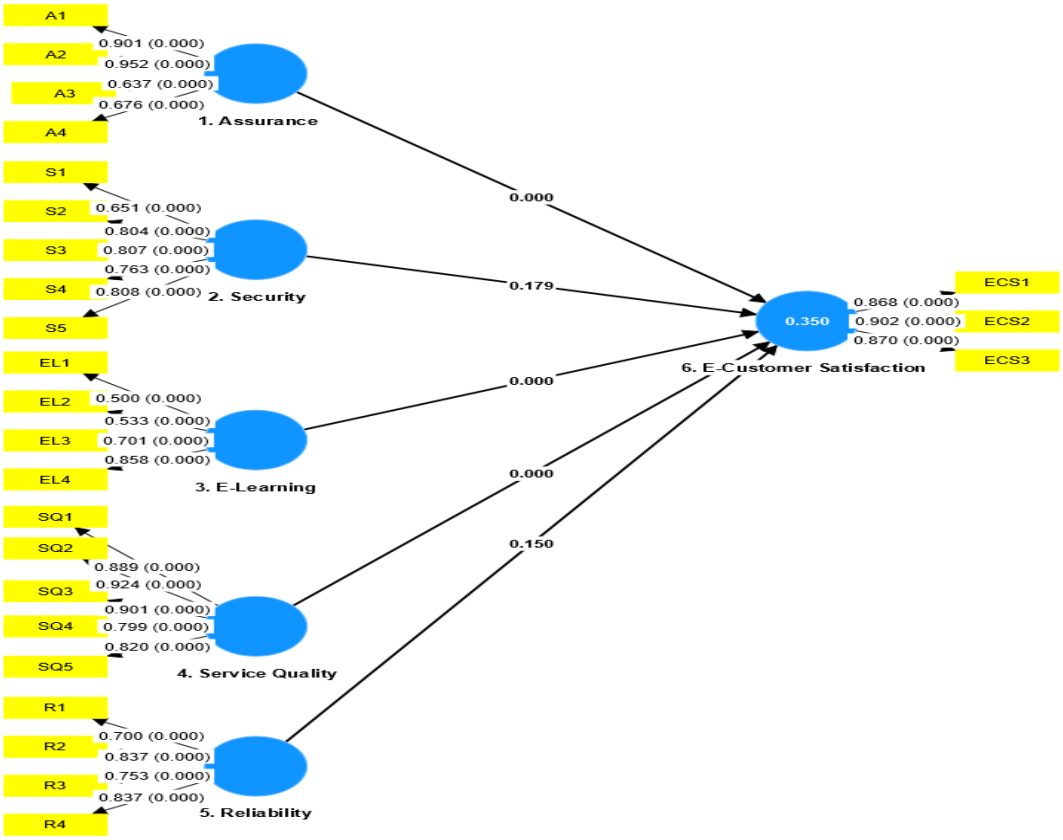

Figure 2: Results of Smart PLS 4.0

Demographic characteristics of the respondents

IBM SPSS Statistics 29.0 is used by researchers for analyzing the demographic values of the respondents. Table 1 reveals that 56.0% females and 44.0% males from the respondents use web-based banking services. The age of most of the respondents are between 20 to 30 where 27.3% (age between 20-25) and 59.1% (age between 26-30). The majority of the respondents use smartphones (79.9%) to contact banking services. Around 50.0% of the respondents used one website, 29.4% used two websites, 14.6% of the respondents used three websites and only 6.0% of the respondents used more than three websites. Only 13.5% of the respondents have more than 5000 monthly transactions. Daily web based internet banking service users are 22.4%, monthly 40.6%, weekly 30.2% and yearly only 6.8%. The occupations of the majority of the respondents are others (46.6%) i.e. students where private job holder 13.0%, public job holder 7.8% and self-employed 32.6%. The demographic information of the study reveals that respondents are well educated i.e. undergraduate only 3.6%, graduate 59.6%, post graduate 28.9% and others 7.8%.

Table 1: Demographic Characteristics

Constructs	**Items**	**Frequency**	**%**
Gender	Female	215	56.0
	Male	169	44.0
Age	20-25	105	27.3

	26-30	227	59.1
	31-35	43	11.2
	Above	9	2.3
Device for Internet Usage	Computer	39	10.2
	Smartphone	307	79.9
	Tablet	38	9.9
Number of web-based banking websites usage	Used 1 Website	192	50.0
	Used 2 Websites	113	29.4
	Used 3 Website	56	14.6
	Used More Than 3 Websites	23	6.0
Monthly transaction (approx.)	1000-3000	112	29.2
	3000-5000	43	11.2
	Below 1000	177	46.1
	More than 5000	52	13.5
How Long Have You Been Using Web-based Banking?	Daily	86	22.4
	Monthly	156	40.6
	Weekly	116	30.2
	Yearly	26	6.8
Occupation	Others	179	46.6
	Private Job Holder	50	13.0
	Public Job Holder	30	7.8
	Self-Employed	125	32.6
Education level	Graduate	229	59.6
	Others	30	7.8
	Post-Graduate	111	28.9
	Under Graduate	14	3.6

Measurement Model analysis

The measurement model indicates the constructs' quality, which starts with the measurement of factor loadings, helping to establish the construct reliability and validity of the model analysis. Although the assessed factor loading over 0.7 is desirable in the research model (Vinzi et al., 2010), the factor loadings of all the items in the measurement model are acceptable at a minimum of 0.50 (Hair et al., 2010). But researchers frequently get lower outer loadings (<0.70) in social science studies. Every item in the correlation matrix has a relationship with the principal component indicated by factor loading, which ranges from -1.0 to +1.0, where higher values imply a higher correlation of the item with the construct (Pett et al., 2003, p. 299). According to Hair et al. (2016), it is advised that items inside constructs with outer loadings ranging from 0.40 to 0.70 should only be evaluated for removal if their deletion leads to an increase in the composite reliability (CR) or average variance extracted (AVE) over the acceptable threshold. The factor loadings range from 0.50 to 0.952, and all the values are within the benchmark range and higher than the recommended values. Researchers didn't eliminate any item of any construct since EL1 loading 0.500 and EL2 loading 0.533 would not raise the CR and AVE and the construct values were already over the required level.

The reliability is generally measured using Cronbach's alpha, rho_c, which has a recommended value of 0.700 (Wasko&Faraj, 2005). The Cronbach's Alpha ranged from 0.696 to 0.918, whereas Composite Reliability assessed values ranged from 0.750 to 0.938. The convergent validity of the study was deemed satisfactory as the average variance extracted (AVE) values ranged from 0.510 to 0.774, surpassing the minimum

threshold of 0.500. Both indicators of reliability and validity have values over the required threshold of.70 (Hair et al., 2011). Hence, the measurement model is well established with satisfactory indicators' statistics.

Table 2. Measurement Model Result

Constructs	Items	Outer loadings	Cronbach's alpha	CR (rho_c)	AVE
A	A1	0.901	0.805	0.876	0.645
	A2	0.952			
	A3	0.637			
	A4	0.676			
ECS	ECS1	0.868	0.826	0.878	0.591
	ECS12	0.902			
	ECS3	0.870			
EL	EL1	0.500	0.6960	0.750	0.510
	EL2	0.533			
	EL3	0.701			
	EL4	0.858			
	EL5	0.500			
R	R1	0.700	0.918	0.938	0.753
	R2	0.837			
	R3	0.753			
	R4	0.837			
S	S1	0.651	0.801	0.864	0.614
	S2	0.804			
	S3	0.807			
	S4	0.763			
	S5	0.808			
SQ	SQ1	0.889	0.855	0.911	0.774
	SQ2	0.924			
	SQ3	0.901			
	SQ4	0.799			
	SQ5	0.820			

Sources: the authors.

The assessment of discriminant validity involves the comparison of correlations between latent variables with the square root of Average Variance Extracted (AVE), as proposed by Fornell and Larcker (1981). Additionally, the Heterotrait-Monotrait ratio of correlations (HTMT) introduced by Henseler et al. (2015) is utilized, with values below the conservative threshold of 0.85. Therefore, the establishment of discriminant validity may be shown in Table 3.

Table 3. Result of Discriminant Validity (HTMT Matrix) and Fornell and Larcker Criterion

	A	S	EL	SQ	R	ECS
A	**0.840**	0.784	0.868	0.664	0.769	0.803
S	0.328	**0.534**	-0.123	-0.024	0.430	0.263
EL	0.571	0.659	**-0.250**	0.729	-0.053	0.574
SQ	0.106	0.088	0.071	**0.456**	0.310	-0.062

R	1.088	0.368	0.644	0.21	**0.248**	0.899
ECS	0.599	0.291	0.449	0.27	0.601	**0.508**

Note: A=Assurance; S=Security; EL=E-Learning; SQ=Service Quality; R=Reliability; ECS=E-Customer Satisfaction

Note: Bold values in Table 3 imply AVE square root values (diagonally larger values throughout all connected columns and rows).

Structural Model

Following the completion of the measurement model assessment, the subsequent phase involves the evaluation of the structure path. This evaluation involves looking at the path coefficients that measure the connections between study components and figuring out how statistically significant they are, which supports the hypotheses. The structural model is presented in Table 4, and the results are as follows:

H1 evaluates assurance significantly and positively affects ECS. The findings expressed that assurance has a significant and positive influence on ECS (B = 0289, t = 3.869, p<0.001). Therefore, H1 is supported. H2 reveals that security doesn't significantly and positively affect ECS. The findings of the study indicate that the influence of security on ECS is statistically negligible (B = 0.048, t = 0.919, p<0.179). Therefore, the hypothesis H2 is not supported. The findings suggest that there is a strong and positive relationship between e-learning and ECS, as shown by H3. The findings indicate that the utilization of e-learning has a substantial and favorable influence on ECS, as evidenced by the statistically significant regression coefficient (B = -0.203, t = 4.051, p<0.001). Therefore, the evidence supports the claim that H3 is valid. The study findings suggest that there is a strong and positive relationship between service quality, as measured by H4, and the customer's evaluation of the electronic customer service (ECS). The findings indicate that there is a statistically significant and positive relationship between service quality and ECS (β = -0.214, t = 5.314, p < 0.001). Therefore, the hypothesis H4 is supported. The findings of study H5 indicate that there is no substantial favorable impact of relying on web-based financial services on electronic commerce success (ECS). The findings of the study indicate that the influence of dependability on ECS is not statistically significant (B = 0.085, t = 1.036, p<0.150). Therefore, support for H5 is not supported.

Table 4. Path-coefficient and hypothesis test results

Hypothesis	Relationship	Original sample (O)-Beta	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Decision
H1	A-> ECS	0.289	0.291	0.075	3.869	0.000	Accepted
H2	S-> ECS	0.048	0.050	0.052	0.919	0.179	Rejected
H3	EL- > ECS	0.203	0.210	0.050	4.051	0.000	Accepted
H4	SQ-> ECS	-0.214	-0.214	0.040	5.314	0.000	Accepted
H5	R -> ECS	0.085	0.077	0.082	1.036	0.150	Rejected

Sources: Author Work.

5. Discussion

The study objective is to analyze the positive impression of web-based banking services, key services, quality, and versatile customer demographics offered by private banks in Bangladesh towards electronic customer satisfaction. The items of the constructs (assurance, security, e-learning, service quality, and reliability) are evaluated by research

instruments to analyze the data and find out the correlation for the statistical value of ECS.

The value of r square found in this study is 0.350, which indicates 35% of the variation in the outcome from independent variable to dependent variable. H1 is supported, which means there is a positive impact on ECS. The private banks of Bangladesh have been able to provide the assurance of web-based banking services to their target customers. H2 is not supported because there is a security risk assumed by the customers in the banking sectors of Bangladesh that is a focal point to work on in the future. The risks during transactions (online and offline technical, operational, and other risks) might be minimized by the private banks in Bangladesh taking anti-fraud measures and providing customer-friendly web-based core banking services. H3 of the study is supported because the target customers in private banking services are more comfortable with electronic learning to conduct their daily financial transactions. H4 is supported in this study because the service quality of private bank services in terms of electronic customer satisfaction has increased in recent years. H5 is not supported in this study because of the reliability issue. People in their financial transactions are worried about a recent scam in the banking sector regarding the lack of online security measures taken by the authority.

As Bangladesh is in the very basic stage of web-based banking services, electronic customer satisfaction is a matter of concern for a number of things, like security and reliability of the web-based banking services, that have a negative impact on early adjustment. Private banks in Bangladesh have been facilitating a number of mechanisms for improving service quality, including an online database for customer satisfaction, an e-learning platform for the target customer, and factors of assurance. Assurance, e-learning, and service quality have a significant impact on achieving e-customer satisfaction in the private sector banks in Bangladesh that are supported by H1, H3, and H4.

6. Implications

Theoretical Implication

This study offers a theoretical contribution to the current body of work about the uptake of web-based banking services in developing countries. Extensive research has been directed in previous studies to examine the influential factors of web-based banking services. Limited research has been studied on the impression of web-based banking systems on ECS in Bangladesh. It has turned out that ECS is considerably hinged on collective factors like security, reliability of the tech system, assertions to adjust new technology, i.e., web-based banking services, quality of the services offered by the private banks in Bangladesh, and so on. Existing studies This study also contributes to how the dependent variables are directly correlated with the ECS in the private banks in Bangladesh as regards web-based banking services rendered. Lastly, results from this particular study will yield an exceeding understanding for policymakers, bank management, and the board of directors to generate or introduce tech products for the target audience in this country setting in order to pay off e-customer satisfaction in the cutthroat market of private sector banks in Bangladesh.

Practical Implication

Most of the customers trust web-based banking services because they believe that private banks have knowledgeable employees and service centers, trustworthy online services platforms, and secured online applications to conduct transactions. But in most cases, they feel insecure about the infrastructural development of web-based banking services, lack of confidentiality, lack of stability, unsafe electronic banking, and so forth. In this study, it has been revealed that there is flexibility in banking education and available training programs for knowledge and awareness to serve customers well and accomplish

the objectives of the private banks. The speed of service delivery, reduced cost, increased competition, user friendliness and accessibility, and continuous quality development are exponentially improving because of the banking competition in developing the newest technology, application programs, e-wallets, and web-based banking services by the private banks (Akter et al., 2023). Although banking transactions on online platforms are error-free, have adequate security, a time-saving tendency, better services, and simplicity, the target customers in Bangladesh are not slightly reliable as the services are new.

7. Conclusion

Technology's disruptive power has expedited the shift to internet banking. E-banking, often known as online banking, uses cloud services to achieve its goals more efficiently. Banks hope their new cloud-based products on the internet will maximize client happiness by ensuring service quality and ease of use (Cornelli et al., 2023). To achieve this goal, we must study how web-based e-banking services affect client satisfaction in our country. The study's findings will assist legislators in developing web-based banking policies.

Limitation of the Study

Firstly, although the study reveals some meaningful insights, it has some limitations as the data were collected from a few groups of people, like students and private job holders with homogeneous lifestyles and preferences. Future research can be studied based on longitudinal data along with other model variables in order to find out the possibility of a relationship between variables. Secondly, the sample size was very small (only 384 respondents) in this study. Next, research can be conducted with over 1000 respondents. Thirdly, the questionnaire was condensed, and there was no in-depth questionnaire for further analysis. 500 questionnaires were distributed, out of which 415 were collected; 31 incomplete responses were not considered. Finally, this 3 months' time is not enough for an in-depth study of the research topic. And the study is only conducted based on private banks in Bangladesh. The government and other foreign banks should be included in the further study.

Future Direction

It is recommended that policymakers in the private banking sector of Bangladesh introduce user-friendly and promising offerings to attract young generations for faster adoption of web-based banking services by facilitating low-cost leadership, strong security, generating literacy, and building awareness regarding web-based banking. Bank management should increase the level of e-customer satisfaction among target customers in the private banks in Bangladesh by improving security measures, increasing the level of reliability, and introducing a strong infrastructure and security system for web-based banking services in Bangladesh.This study is insightful for the product development department of private banks in Bangladesh in order to develop customer-oriented web-based banking service applications and wallets for smooth personal banking. IT professionals in private banking services should focus on increasing security aspects and decreasing technical errors when conducting web-based banking transactions and operations.

Declaration of Interest

There is no conflict of interest among the authors in conducting and publishing this research paper. No funding has been received to conduct the study.

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Declaration of generative AI

For conducting this research, there is no usages of AI for writing. Authors have agreed to this statement.

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