



## Self-service technology banking under scrutiny: Does it truly improve customer engagement?

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### ABSTRACT

The purpose of this research was to uncover the effect of self-service technology banking on customer engagement among the banking clients of Kathmandu, Nepal. This study embraced website attributes, fulfillment, privacy, security, responsiveness, and ease of use as independent variables and customer engagement as a dependent variable. This research employed customer engagement theory for evaluating the emotional, psychological, and behavioral connections between brands of products or services and their customers. Similarly, the Unified Theory of Acceptance and Use of Technology (UTAUT) adopted in the study encompasses several ideas of technology adoption, particularly concerning the behavioral aspects of users. Moreover, this study embraced a descriptive and causal research design to test the research hypotheses. The study covered the digital banking service users in Kathmandu, Nepal. The primary sources of information used in the study were cross-sectional data. The purposive sampling technique was used for the study. Moreover, 416 structured questionnaires were distributed to the target customers, and 150 useful ones were received. Similarly, the research used descriptive and inferential statistics to reflect the widespread characteristics of respondents and generate the results of correlation and regression analysis. Additionally, the research explored reliability through the Cronbach's alpha test. The findings of the study revealed a positive effect of website attributes on customer engagement; however, this effect was found to be insignificant. Next, the findings depicted a positive and significant impact of fulfillment and privacy on customer engagement. Similarly, the evidence derived from this study depicted a positive and significant effect of security, responsiveness, and ease of use on customer satisfaction. Thus, the findings of this research can be a foundation for policymakers, banking institutions, and other stakeholders while crafting strategies to create customer engagement in digital banking services. Finally, the findings of this research can contribute to the existing theory by making it easier to comprehend technology-based banking services.

**Keywords:** Customer Engagement, Ease of Use, Responsiveness, Self-Service Technology Banking

### I. INTRODUCTION

The banking institutions struggle against several dynamic forces emerging in their operation due to the volatility of their market. Next, an evolution of advanced self-service banking known as technology-driven banking service became a pivotal leading dimension of banks as client engagement expects remote self-services. Therefore, the integration of digital self-banking services fosters customer retention and engagement in remotely operational self-service banking in the modern era. Moreover, customer engagement is considered a cognitive position that occurs with a communicative and collective experience of clients for the brand (Brodie et al., 2011). Thus, one of the strategic paths of the banking institution to stabilize the institutional position better requires a forward move to mitigate prevailing complexity, emphasizing and fostering client engagement with the banking services (Harmeling et al., 2017).

In addition, the website elements associated with the self-service banking system are essential, as they exhibit quantifiable characteristics and functional aspects of technology-based services, which ultimately influence customer experiences, service efficacy, and usability (Palmer, 2002). Interestingly, all of these characteristics of the website have an impact on the degree to which customers are satisfied, the amount of faith that those customers have in the website, and the level of engagement that customers have with the self-service banking system (Loiacono et al., 2007).

Moreover, self-service banking offers high-quality, personalized features that add value and encourage customers to return, helping to build trust in online transactions and create positive feelings and stronger connections (Tuch et al., 2012; Eller et al., 2020). Next, the fulfillment also includes providing banking services to clients, such as processing transactions, setting up technology-based services, checking for compliance, and diagnosing issues, all of

which are important for client satisfaction and improving customer engagement in self-service banking (Roggeveen & Sethuraman, 2020). Similarly, fulfillment promotes banking clients' participation by providing seamless, efficient, and personalized experiences that align with client expectations, fostering trust and satisfaction in their interaction with self-service banking (Lemon & Verhoef, 2016). Additionally, digital self-service banking privacy embodies the system of client protection, particularly for the safeguarding of consumer information and data from unwanted access, while ensuring compliance with requisite standards and promoting transparent practices (Sahu et al., 2021). Thus, self-service privacy banking functionalities foster trust and reduce risk while encouraging regular visits and interactions via digital banking (Li et al., 2021). Importantly, customers are encouraged to make efficient use of self-service banking when they are guaranteed the privacy system (Hwang et al., 2022).

Moreover, security in self-service banking systems is a crucial factor of service quality, including institutional and technological measures used to safeguard client data and ensure safety in digital transactions, which provide many levels of protection. This security also improves customer engagement in self-service banking, promoting a safer transaction gateway, eventually driving frequent usage and generating more trust (Chua et al., 2021). Next, responsiveness is seen as a crucial element of self-service banking services, significantly contributing to the enhancement of client engagement with digital banking systems. Furthermore, responsiveness denotes the speed, efficacy, and efficiency of self-service banking in promptly addressing client concerns and resolving other difficulties (Parasuraman et al., 1988). Importantly, the responsiveness associated with self-service banking improves client engagement by providing rapid and seamless interactions that meet consumer expectations. Consequently, prompt transaction processing, swift resolution of current concerns and error recovery mitigate dilemmas and enhance confidence, eventually fostering consumer involvement (Dabholkar, 1996; Zeithaml et al., 2000). Similarly, the user-friendliness of self-service technology banking plays a crucial part in customer engagement, where ease of use reflects the extent to which customers see self-service as straightforward and simple to use (Davis, 1989). Therefore, user-friendliness in self-service technology banking substantially enhances consumer engagement by reducing cognitive load and alleviating perceived limitations, hence promoting the frequent use of digital services (Venkatesh et al., 2003).

In the Nepalese context, some of the research revealed in this field relates to enhancing the quality of customer services (Gautam & Sah, 2023). Next, a study on customer satisfaction with mobile banking services in Nepalese commercial banks was conducted (Goet & Kharel, 2022). Similarly, the next discovery explored understanding service quality, customer satisfaction, and loyalty in commercial banks in Nepal (Adhikari et al., 2025). Moreover, another study was conducted on the impact of digitalization on customer satisfaction in Nepalese commercial banks (Niroula, 2024). Further studies exist on customer-driven evaluation of service quality in Nepal's banking sector (Poudel & Niroula, 2024). In addition, previous research identified a connection between self-service banking and consumer happiness and loyalty. Especially, the evidence from prior research is found to be inconsistent. Nevertheless, the Nepalese banking sector has yet to explore the relationship between self-service technology banking and client engagement via a deeper inquiry. Therefore, this research aims to examine the impact of self-service banking, including website attributes, fulfillment, privacy, security, responsiveness, and simplicity of use, on consumer involvement.

## 1.1 Research Objectives

The general objective of this study is to investigate the impact of self-service technology banking services on customer engagement. Further, the specific objectives reflect the following:

- i. To study the status of self-service technology banking services and clients' engagement.
- ii. To assess the association between website attributes, fulfillment, privacy, security, responsiveness, ease of use, and customer engagement

## II. LITERATURE REVIEW

### 2.1 Theoretical Review

The literature review of this research article encompasses significant theoretical works to construct a research foundation, followed by an empirical evaluation of the research variables. Customer engagement theory, as proposed by Brodie et al. (2011), evaluates the emotional, psychological, and behavioral connections between brands of products or services and their consumers. This ideology emphasizes interaction and trust-building as essential components (Vivek et al., 2012; Hollebeek et al., 2014). Consequently, consumer involvement is multifaceted, including mental, emotional, and behavioral dimensions that contribute to the establishment of customer loyalty and value (Pansari & Kumar, 2017). Furthermore, the technology-driven self-service banking framework enhances customer engagement by facilitating personalized, real-time interactions between customers and service providers (Harmeling et al., 2017).

In addition, the Unified Theory of Acceptance and Use of Technology (UTAUT) encompasses several ideas of technology adoption, particularly concerning the behavioral aspects of its users. The principal elements of this philosophy are performance expectancy, which denotes the perceived benefits of technology-based services, and effort expectancy, sometimes referred to as ease of use, inherent within the services outlined in the theory. Furthermore, the UTAUT framework emphasizes social influence as a primary element, illustrating the impact of peers on the adoption of technology-based services. Additionally, it includes facilitating conditions as a key component, highlighting the robustness of the support system for these services. In summary, the core idea of this approach is the use of information technology (Venkatesh et al., 2003).

## 2.2 Empirical Review

### 2.2.1 Website Attribute and Customer Engagement

The attributes of a website include the characteristics that dictate its functionality, utility, and overall user experience, including the portal's layout, security, responsiveness, customization for particular services, and accessible interaction choices. Furthermore, layout architecture and functionality are crucial in determining how effectively customers can interact with the online portal since superior design guarantees the utility and accessibility of services, which ultimately impacts customer engagement (Shaikh & Karjaluoto, 2015; Alalwan et al., 2017). Moreover, the website's virtue of incorporating customization capabilities for personalized service promotes client retention via engagement, stimulating customers to use self-service technology banking (Aldas-Manzano et al., 2010). Next, the correlation between self-service banking attributes and customer engagement is established based on the factor of service quality. Consequently, the findings indicate that website features influence consumer satisfaction, thus improving customer engagement (De Leon et al., 2020). In addition, the research indicated that website features, including design, content quality, and usability, influence customer engagement by enhancing the overall experience and satisfaction levels among clients (Dangaiso et al., 2024). Next, the well-designed and user-friendly online portal enhances positive sentiment, prolonging website visits and increasing the frequency of self-service banking use, thus promoting client engagement (Khan & Alhumoudi, 2022). Based on the empirical review, the following research hypothesis has been developed:

*H<sub>1</sub>: Website attribute affects the customer engagement in self-service banking*

### 2.2.2 Fulfillment and Customer Engagement

The word fulfillment in the context of digital banking service denotes the condition in which customer expectations are met or surpassed, enabling users to achieve the desired outcomes when engaging with self-service banking systems (Lin & Hsieh, 2011). Similarly, fulfillment is associated with client satisfaction, as it provides a positive sentiment and experience with digital banking services, eventually correlating with customer engagement and client retention (Parasuraman et al., 1988). The findings of the empirical research showed that the customized characteristics of the virtual banking system contribute to an increase in consumer engagement in the self-service banking application (Iqbal et al., 2018). Similarly, another research indicated a substantial beneficial correlation between service completion and customer happiness in self-service banking, from a case derived from Bangladesh (Gazi et al., 2024). Next, fulfillment plays a crucial role in expanding customer involvement by providing a transaction that is free of errors, establishing trustworthiness, and encouraging customer participation in self-service. It is the banking industry's advocacy that fast service is the key to establishing customer happiness, which ultimately leads to consumer participation (Parasuraman et al., 1988). Moreover, the systems that enable speedy service encourage customers to use the service more often. A higher level of client participation in the service is achieved via adoption and fast fulfillment (Hsu et al., 2015). Additionally, reliable service performance also gives opportunities for active participation in self-service banking (Cronin et al., 2000). Based on the review of empirical studies, the following hypothesis has been formulated:

*H<sub>2</sub>: Fulfillment affects customer engagement in self-service banking.*

### 2.2.3 Privacy and Customer Engagement

The term "privacy" in the context of digital banking refers to the process of protecting different forms of information from being accessed by unauthorized parties, regulating against abuse, and allowing clients to engage in self-service technology-based banking practices (Belanger & Crossler, 2019). Moreover, the secrecy of the information is reflected in this privacy, which also reveals the openness of the service and makes it easier for consumers to organize their data preferences (Smith et al., 2021). Thus, a proper privacy policy that is connected with self-service banking led to an increase in client engagement, as shown by the finding (Kim et al., 2022). Similarly, the evidence on internet banking users and service privacy indicates a correlation with customer engagement, particularly in the context of Indonesian research, which highlights concerns about privacy related to websites, customer service,

and online interactions (Hendriyani et al., 2018). Next, the presence of a privacy system, in conjunction with the availability of self-service options, not only increases the level of confidence among its users but also encourages customer participation in the service. In addition, there is a correlation between the availability of greater privacy and the increased frequency of self-service banking, as well as the increased engagement of customers (Kim et al., 2022). Based on the review of the literature, the following hypothesis has been formulated:

*H<sub>3</sub>: Privacy affects customer engagement in self-service banking.*

#### **2.2.4 Security and Customer Engagement**

The perceived security represents the cognitive assessment of self-banking services that concentrate on the safety of digital banking services. It is a process of keeping the system secure against illegal access and abuse of information (Candiwan & Rianda, 2024). Moreover, an atmosphere that encourages consumer involvement and adoption of digital banking is created by the security that is linked with self-banking services (Anouze & Alamro, 2020). In addition, the empirical evidence that was generated from several studies brought to light the fact that the security that is associated with self-service banking is positively related to customer engagement, which in turn increases the adoption of technology-based financial services and builds the trust of its customers (Kim et al., 2022). Thus, ensuring a better level of safety via the use of self-banking services boosts the satisfaction of the customer, creating an environment that encourages participation (Mbama & Ezepue, 2018). Therefore, the promotion of the mechanism for self-service security by financial institutions leads to an increase in successful sales in conjunction with interested customers (Singh et al., 2020). Based on the empirical review, the following hypothesis has been developed:

*H<sub>4</sub>: Security affects customer engagement in self-service banking.*

#### **2.2.5 Responsiveness and Customer Engagement**

The responsiveness of self-service banking is a representation of its capacity to offer digital banking services in an efficient manner while also successfully satisfying the requirements of its customers (Parasuraman et al., 2005). A system for service performance that includes a speedy procedure, automated functioning, and rapid recovery of the service is included within it (Jun & Cai, 2001). Self-service banking, which reveals responsive technological services, has been shown to drive recurring engagement with a greater degree of customer satisfaction, reflecting the evidence from earlier empirical findings (Zeithaml et al., 2018). Moreover, it is possible to reduce the level of discontent among customers by providing them with self-service banking options that are both simple and quick to respond to their needs (Dabholkar, 2020). Similarly, a more successful engagement of customers with self-service banking may be achieved via the development of responsive self-service that allows for customized and tailored interaction (Lemon & Verhoef, 2016). Based on the review of the literature, the following hypothesis has been developed:

*H<sub>5</sub>: Responsiveness affects the customer engagement in self-service banking.*

#### **2.2.6 Ease of Use and Customer Engagement**

The term "ease of use" in the context of technology-based financial services refers to the degree of independence from the effort required to utilize a system as compared to other banking services (Davis, 1989). The findings indicated that developing an efficient and user-friendly technology-based banking platform for transactions facilitates simplicity of use, ultimately fostering improved customer experiences and improving client engagement (Windasari et al., 2022). Additional research results from the previous study indicated that customer involvement and perceived usability positively enhance the customer experience, hence increasing engagement (Mbama & Ezepue, 2018). There is more evidence that the quality of digital banking is determined by how easy it is to use, which in turn encourages customer participation (Bilgihan et al., 2016; Jun & Cai, 2001; Rose et al., 2011). Moreover, the use of technology-based banking interfaces that are easy to understand and use has led to an increase in customer engagement (Venkatesh et al., 2012). Similarly, the streamlined and user-friendly platform, which is designed to be compatible with digital transaction systems, is associated with increased and consistent use of online banking services, which in turn increases the participation of clients (Alalwan et al., 2017). In addition, there is a favorable correlation between the perceived simplicity of use and the amount of involvement of customers in self-service banking (Weidlich & Bastiaens, 2017). These characteristics, when combined with self-service banking, provide an environment that encourages consumer engagement and retention of banking customers (Singh et al., 2020). Based on the review of previous research, the following hypothesis has been crafted:

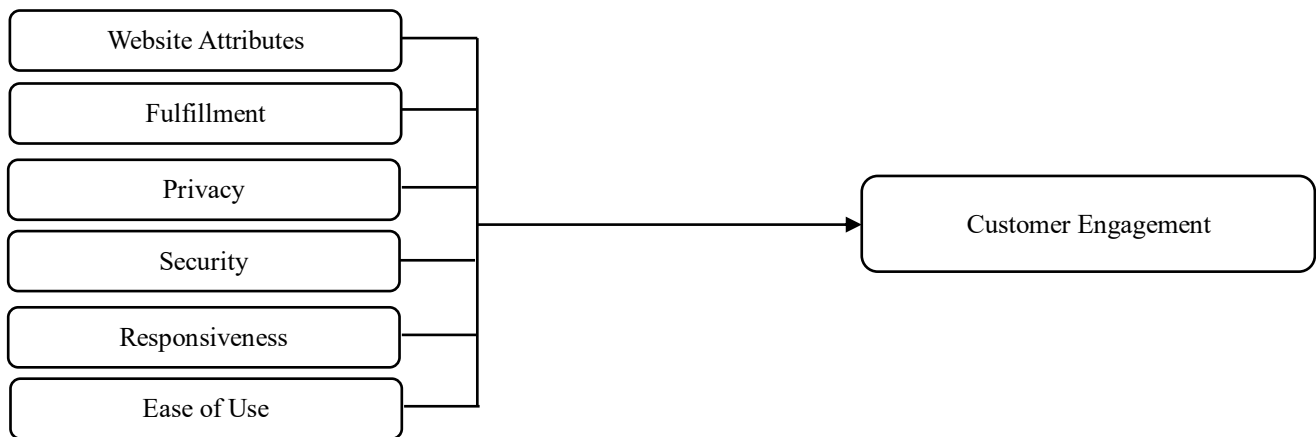
*H<sub>6</sub>: Ease of use affects customer engagement in self-service banking.*

### 2.2.7 Customer Engagement

Customer engagement is a word that takes into consideration the behavioral ties with cognitive and emotional feelings that are inclined to the client and service brand, and that show active participation via the use of recurrent service engagement (Brodie et al., 2011). In addition to this, it involves continuous contact that goes beyond the transactional relationship, which strengthens the connection with the services (Hollebeek et al., 2014). In the realm of online banking services, the engagement is driven by the experiences of tailored and individual sensations, an atmosphere of trust, and the value that is felt by customers. These factors lead to the enhancement of consumer involvement, as well as an increase in the degree of satisfaction among customers (Pansari & Kumar, 2017). On the other hand, it is generally accepted that customer engagement refers to the mechanism of interactions that an organization employs in order to connect with customers and candidates for customers (Van Doorn et al., 2010).

### 2.3 Conceptual Framework

The purpose of this research framework was to investigate the connection between the services offered by self-service technology banking services and the level of customer involvement, as well as the impact that self-service banking has on consumer engagement. Independent factors included website characteristics, fulfillment, privacy, security, responsiveness, and ease of use. Additionally, the dependent variable is customer engagement with the quality of service.



**Figure 1**  
*Conceptual framework*

Source: Brodie et al. (2011); Abdurrahman (2024)

## III. METHODOLOGY

The purpose of the research was to examine the effect of self-service technology banking on customer engagement among the users of digital banking services. Thus, this study adopted website attributes, fulfillment, privacy, security, responsiveness, and ease of use as independent variables. Similarly, customer engagement is the dependent variable of the study. The population of the study consisted of the clients using the technology-based banking services in Kathmandu, Nepal. Further, this research accumulated primary sources of cross-sectional data. Next, the study employed a purposive sampling technique. A structured questionnaire of 416 was disseminated to the target respondents, and a useful questionnaire of only 150 was received from the participants of the survey, representing merely 36.06 percent responses. The questionnaire was segmented into two dimensions, consisting first part as general background information of respondents and the second part of gathering opinions of participants using a five-point Likert scale. The five-point Likert scale, ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, to 5 = Strongly Agree, was adopted in the study. The construct website attribute was adopted from the study by Field (2018), consisting of four item statements. The sample items of the construct contain “The website is user-friendly, and the navigation system is well-designed” and “The website's functionality is well-equipped for banking purposes”. Similarly, the fulfillment construct was adopted from the study of George and Mallery (2019), comprising four statements. The sample statement represents “The digital banking promptly provides a confirmation of the requested service” and “It’s quick for me to log out of my account”. Moreover, the privacy construct was taken from the previous study by George and Mallery (2019), containing four item statements. The representative items contain “The digital banking service keeps my personal information safe” and “The IB service is secure and protected against fraud and hacking”. Next, the security construct was used from the study of George and Mallery (2019), comprising the four-item statements. The sample statements reflect “My financial operations are thoroughly safeguarded by the e-banking service” and “Internet banking servers accurately safeguard customer information”. Moreover, the construct



responsiveness was adopted from the study by George and Mallery (2019), containing its three-item statements. The sample item statement represents “Internet banking services are accessible 24 hours a day” and “E-Banking services provide immediate notifications on inquiries”. Additionally, the ease of use construct was derived from the study Abdurrahman (2024), comprising four item statements. The sample statements contain “The E-Banking tool lets me quickly complete any purchase” and “A straightforward method exists for transaction cancellation”. Finally, the customer engagement construct was adopted from the study by Brodie et al (2011), containing six-item statements. The sample statement comprises “I prefer using online banking over visiting the bank” and “I feel I made the proper choice by utilizing online banking services”.

This research used the JAMOVI Version 2.6 and STATA 14 for the analysis of the data. The study tested Cronbach’s alpha for the study to assess internal consistency. Next, this research employed descriptive statistics containing frequency, mean, and standard deviation to reflect the general characteristics of the respondents who participated in the survey (Gravetter & Wallnau, 2020). Similarly, the correlation analysis conducted in the study assesses the degree of strength and direction of the relationship between the variables (Field, 2018). Moreover, the regression analysis took place in the study to examine the effect of independent variables on dependent variables (Gravetter & Wallnau, 2020). Thus, the following table manifests the reliability of Cronbach’s alpha for the study:

**Table 1**  
*Reliability test*

Variables	Items	Cronbach's Alpha
Website	4	0.941
Fulfillment	4	0.935
Privacy	4	0.936
Security	4	0.943
Responsiveness	4	0.930
Ease of Use	4	0.933
Customer Engagement	6	0.932

Table 1 presents the reliability assessment of study variables using Cronbach’s alpha. Consequently, Cronbach's alpha evaluates the internal consistency of each item within the structure. It assesses the degree of association among the item assertions. In addition, a higher Cronbach’s alpha value indicates more consistency among the item statements. The Cronbach’s alpha values for website characteristics, fulfillment, privacy, security, responsiveness, efficiency, simplicity of use, and customer involvement with quality of service were 0.941, 0.935, 0.936, 0.943, 0.930, and 0.932, respectively. The Cronbach's alpha score in this research exceeds 0.70, indicating enhanced dependability (George & Mallery, 2019).

**3.1 Model Specification**

The model specification used in this study elucidates the statistical framework, including the research variables, which underpins the evaluation and determination of the relationship between the variables. This model specification provides the basis for the research framework (Wooldridge, 2020). This research used the independent variables of website qualities, satisfaction, privacy, security, responsiveness, efficiency, and simplicity of use. Likewise, client involvement is the dependent variable. Consequently, this research introduces the following model for examination:

$$CE = \alpha + \beta_1 WBAT + \beta_2 FULM + \beta_3 PVC + \beta_4 SEC + \beta_5 RSP + \beta_5 EOU + e_i \dots\dots\dots (1)$$

Where,

- CE = Customer Engagement
- WBAT = Website Attributes
- FULM = Fulfillment
- PVC = Privacy
- SEC = Security
- RSP = Responsiveness
- EOU = Ease of Use

Thus, this model depicts the path for the study, facilitating the examination of the association and influence between the research variables.

## IV. FINDINGS & DISCUSSION

### 4.1 Findings

#### 4.1.1 Profile of Respondent

Table 2 of the responder profile has 150 individuals. Out of the total participants, 92 (61.20 percent) were under 25. In a comparable manner, the cohort of participants aged 26 to 35 years included 49 individuals (32.7 percent). The age group of responders above 36 years consisted of 9 individuals, accounting for 6 percent participants. Furthermore, the male responders include 66 individuals, representing 44 percent, as survey participants. The female cohort of participants included 84 individuals, accounting for 56.4 percent. The educational background of participants below the upper secondary level (10+2) is 23 (15.30 percent), while those at the bachelor's level comprise 86 (57.30 percent). Among the responders, 30 individuals had a master's degree, constituting 20 percent. Furthermore, the respondents with a PhD constitute 11 individuals (7.30 percent).

**Table 2**

*Profile of respondents*

Background Information	Classification	Frequency	Percentage
Age group of respondents	Less than 25 years	92	61.2
	26-35 years	49	32.7
Gender of respondents	Male	66	44.0
	Female	84	56.0
Educational level of respondents	Below 10+2	23	15.3
	Bachelor's	86	57.3
	Mater's	30	20.0
	PhD	11	07.3
Level of income of respondents	Below 20000	33	22,0
	21000-40000	23	15.3
	41000-60000	18	12.0
	61000-80000	52	34.7
	Above 80000	24	16.0
Usage of self-service banking	Less than a month	38	25.3
	Less than a year	33	22.0
	Between 1 and 2 years	38	25.3
	More than 5 years	41	27.3
Frequencies of usage of self-service banking	Everyday	48	32.0
	3+ times a week	20	13.3
	Twice a week	21	14.0
	Once a week	56	37.3
	Never	05	03.3
	<b>Total</b>	<b>150</b>	<b>100</b>

Table 2 indicates that 33 survey participants (22 percent) had an income below 20,000, while 23 participants (15.30 percent) had an income ranging from 21,000 to 40,000. Likewise, the income bracket of respondents earning between 41,000 and 60,000 included 18 individuals (12 percent). The income group of participants earning between 61,000 and 80,000 comprises 52 individuals, accounting for 34.70 percent. Furthermore, participants with an income above 80,000 include 24 individuals or 16 percent. Furthermore, the use of self-service banking for less than one month among the respondents is represented by 38 individuals (25.30 percent), while those with less than one year of account status comprise 33 individuals (22 percent). The use of self-service banking among individuals with 1 to 2 years of status accounts for 38 (25.30 percent). The utilization status of self-service banking, with over five years of expertise, indicates 41 individuals, or 27.30 percent. Moreover, the frequency of self-service banking use among customers, indicating daily utilization, was 48 (32 percent). Likewise, the users' frequency of around three times each week accounts for 20 individuals or 13.30 percent. The status of holding twice a week is represented by 21 (14 percent), while utilizing once a week is represented by 56 (37.30 percent). Customers indicating no use of self-banking services constitute 5 individuals (3.3 percent).

#### 4.1.2 Correlation Analysis

The correlation analysis conducted for this study attempts to assess the direction and strength of the relationship between the study variables. The independent variables employed in the study are website attributes, fulfillment, privacy, security, responsiveness, and ease of use. Similarly, the dependent variable adopted in the study is customer engagement. The following correlation table shows the association between the study variables:

**Table 3**

*Correlation matrix*

Variables	Mean	SD	WBAT	FULM	PVC	SEC	RSP	EOU	CE
WBAT	3.30	0.206	1.000						
FULM	3.40	0.949	0.077	1.000					
PVC	3.52	1.061	0.061	0.734***	1.000				
SEC	3.17	0.981	0.081	0.632***	0.636***	1.000			
RSP	3.49	1.063	0.034	0.771***	0.761***	0.694***	1.000		
EOU	3.35	1.105	0.071	0.720***	0.746***	0.660***	0.812***	1.000	
CE	3.50	1.059	0.079	0.725***	0.728***	0.668***	0.813***	0.782***	1.000

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , (Note: WBAT = Website attribute, FULM = Fulfillment, PVC = Privacy, SEC = Security, RSP = Responsiveness, EOU = Ease of use, & CE = Customer engagement)

Table 3 illustrates the strength of the correlation between the variables. The correlation analysis indicates a positive link between website features and satisfaction ( $r = 0.079$ ). An increase in website characteristics correlates with a heightened degree of consumer engagement in a favorable manner. The correlation data indicate a favorable association between fulfillment and customer engagement ( $r = 0.725$ ). As fulfillment increases, it enhances customer engagement levels. Likewise, the results indicate that privacy has a good and beneficial correlation with engagement ( $r = 0.728$ ). It also demonstrates that enhancements in privacy result in increased consumer engagement. The results indicate a favorable correlation between security and consumer engagement ( $r = 0.668$ ). It demonstrates that an improvement in security levels concurrently enhances consumer engagement. The responsiveness is favorably correlated with engagement ( $r = 0.813$ ). As response grows, customer engagement also rises. The efficiency and convenience of use are favorably correlated with customer engagement ( $r = 0.782$ ). The improvement in usability enhances consumer engagement.

#### 4.1.3 Regression Analysis

The regression analysis conducted in the study attempts to examine the effect of the independent variables on the dependent variable. Thus, the study embraced website attributes (WBAT), fulfillment (FULM), privacy (PVC), security (SEC), responsiveness (RSP), and ease of use (EOU) as independent variables. Similarly, the study used customer engagement (CE) as a dependent variable. The following table shows the results of the regression analysis:

**Table 4**

*Regression coefficient*

Model	Intercept	WBAT	FULM	PVC	SEC	RSP	EOU	F Value	SEE	Adj. R-Square
1	3.245*** (55.7)	0.0154 (0.97)						0.94	0.20571	-0.0004
2	1.119*** (6.02)		0.650** * (12.8)					163.75	0.65628	0.5221
3	0.962*** (4.66)			0.729** * (12.92)				166.97	0.72955	0.5269
4	1.005*** (4.84)				0.619** * (10.93)			119.37	0.73252	0.4427
5	0.629*** (3.58)					0.816** * (17.01)		289.4	0.62018	0.6594
6	0.495* (2.53)						0.816** * (15.28)	233.45	0.69033	0.6094
7	3.235***	0.00874	0.00974					0.52	0.20633	-0.0064



	(49.62)	(0.34)	(0.42)							
8	3.236*** (48.8)	-0.35 (4.19)	0.0108 (0.42)					0.35	0.20702	-0.0133
9	3.231*** (47.56)	0.00777 (0.26)	0.00756 (0.28)		0.01 (0.4)			0.3	0.20762	-0.0191
10	3.229*** (47.53)	0.0168 (0.55)	0.0203 (0.68)	0.00202 (0.07)	0.0155 (0.61)			0.44	0.20762	-0.0191
11	3.230** (47.34)	0.0158 (0.51)	0.0176 (0.57)	2.09E-05 (0.00)	0.0145 (0.57)		0.0102 (0.34)	0.38	0.20826	-0.0254
12	3.243*** (54.32)	0.00423 (0.17)					0.012 (0.47)	0.48	0.20639	-0.007
13	0.951*** (5.35)	0.339** * (4.63)				0.373** * (4.88)		103.9	0.61518	0.5801
14	3.234*** (51.44)	0.0088 (0.41)			0.0107 (0.46)			0.57	0.20626	-0.0058
15	3.244*** (51.82)	0.0145 (0.62)		0.00132 (0.06)				0.47	0.2064	-0.0072
16	0.951*** (5.35)		0.339** * (4.63)				0.373** * (4.88)	103.9	0.61518	0.5801
17	0.818*** (4.72)		0.259** (3.32)			0.479** * (6.15)		121.13	0.58733	0.6172
18	0.859*** (4.47)		0.490** * (7.47)		0.259** * (3.66)			95.43	0.63041	0.559
19	0.746*** (3.87)			0.436** * (5.50)			0.373** * (4.51)	115.08	0.66669	0.6049
20	0.746*** (3.87)			0.436** * (5.50)		0.373** * (4.51)		117.18	0.66301	0.6093
21	0.746*** (3.87)				0.436** * (5.50)		0.373** * (4.51)	117.18	0.66301	0.6093

t statistics in parentheses, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001, Dependent variable: Customer Engagement (Note: WBAT = Website attribute, FULM = Fulfillment, PVC = Privacy, SEC = Security, RSP = Responsiveness, EOU = Ease of use, & CE = Customer engagement)

Table 4 presents the regression coefficient for evaluating the impact of predators on the dependent variables. The regression coefficient for the qualities of the website has a favorable impact on user engagement ( $\beta = 0.0154$ , t value = 0.97). It means that as the quality of a website improves, client engagement rises correspondingly. Therefore, an improvement in website characteristics by one unit results in a 0.0154 unit difference in engagement. Similarly, the beta value for fulfillment indicates a favorable effect on customer engagement ( $\beta = 0.650$ , t value = 12.8). It shows that the increase in fulfillment enhances consumer involvement in self-service banking. Thus, the modification in fulfillment by one unit results in a 0.650 unit alteration in client engagement. Moreover, the beta coefficient for privacy has revealed a favorable impact on customer engagement ( $\beta = 0.729$ , t value = 12.920), depicting that privacy correlates with heightened consumer engagement in self-service banking. Therefore, a one-unit improvement in privacy results in a 0.729-unit change in the level of customer engagement in digital services.

Furthermore, the beta coefficient for security indicates a significant impact on customer involvement in internet banking services ( $\beta = 0.619$ , t value = 10.93). It means that as the level of security is established, it fosters the degree of customer engagement in self-service banking. As a one-unit change in the security level of the services results in an alteration in customer engagement by 0.619 units. In addition, the beta coefficient for responsiveness indicates a positive effect on customer engagement ( $\beta = 0.816$ , t value = 17.01). It means increased responsiveness correlates with heightened customer involvement in technology-based banking services. Thus, a one-unit rise in responsiveness results in a 0.816-unit increase in customer engagement. Ultimately, the simplicity of usage has a beneficial impact on customer engagement ( $\beta = 0.816$ , t value = 15.28). It means that as usability improves, the customer involvement level rises accordingly. A one-unit alteration in ease of use results in a 0.816-unit difference in customer involvement.

**Table 5***Collinearity statistics*

Variables	VIF	Tolerance
Website Attribute	1.01	0.986
Fulfillment	2.94	0.340
Privacy	2.99	0.334
Security	2.13	0.469
Responsiveness	4.22	0.237
Ease of Use	3.47	0.288

Table 5 presents the collinearity assessment using the Variance Inflation Factor (VIF), illustrating the relationships among the predictor variables. The Variance Inflation Factor (VIF) for the website attribute is 1.01, for fulfillment, it is 2.94, and for privacy, it is 2.99. The VIF for security is 2.13, for responsiveness is 4.22, and for simplicity of use is 3.47. Consequently, all VIF values remained below 0.5, showing the absence of collinearity. This shows that predictor variables are not significantly associated, resulting in trustworthy estimations of regression coefficients (Kutner et al., 2004). Similarly, the tolerance test score signifies the inverse of the Variance Inflation Factor (VIF), and a tolerance score over 0.1 is necessary to show credible estimations (O'Brien, 2007). Consequently, all tolerance ratings in the test exceeded 0.1, showing the criterion for dependable estimations.

**Table 6***Summary of hypotheses*

Hypotheses	Results
H <sub>1</sub> : Website attribute affects the customer engagement in self-service banking	Accepted
H <sub>2</sub> : Fulfillment affects customer engagement in self-service banking.	Accepted
H <sub>3</sub> : Privacy affects customer engagement in self-service banking.	Accepted
H <sub>4</sub> : Security affects customer engagement in self-service banking.	Accepted
H <sub>5</sub> : Responsiveness affects the customer engagement in self-service banking.	Accepted
H <sub>6</sub> : Ease of use affects customer engagement in self-service banking.	Accepted

Table 6 shows the summary of the research hypotheses. The first research hypothesis, H<sub>1</sub>: Website attributes affect customer engagement in self-service banking, is accepted as it found remarkable results. Similarly, the research hypothesis, the second H<sub>2</sub>: Fulfillment affects customer engagement in self-service banking, is also accepted as its findings revealed statistically significant results. Next, hypothesis three, H<sub>3</sub>: Privacy affects customer engagement in self-service banking, is accepted based on its empirical evidence. Moreover, the research hypothesis H<sub>4</sub>: Security affects customer engagement in self-service banking is also accepted, as its results depicted considerable evidence. Additionally, hypothesis H<sub>5</sub>: Responsiveness affects customer engagement in self-service banking is confirmed with theory, as its results were found significant. Finally, the research hypothesis H<sub>6</sub>: Ease of use affects customer engagement in self-service banking is accepted based on its significant findings.

**4.2 Discussion**

The primary objective of the study was to evaluate the impact of self-service banking on customer engagement, using independent factors such as website attributes, fulfillment, privacy, security, responsiveness, and simplicity of use, alongside the dependent variable of customer engagement. This research used data gathered from self-service banking customers in Kathmandu, Nepal. The study's findings indicated a favorable and substantial impact of website attributes on consumer engagement in self-service banking. This indicates that an enhancement in the website quality of self-service banking improves user involvement in digital banking. This finding is in line with the previous findings, which state that website elements improve customer engagement by increasing consumer satisfaction (De Leon et al., 2020). The study also found that website design, content quality, and usability improve consumer happiness and engagement (Dangaiso et al., 2024). Next, the well-designed and user-friendly online portal boosts a positive attitude, keeping website visitors longer and encouraging self-service banking usage, boosting customer engagement (Khan & Alhumoudi, 2022). Similarly, the results indicate a substantial impact of fulfillment on consumer engagement in self-service banking. It illustrates that satisfaction increases via self-service banking, hence enhancing client involvement in digital banking services. This finding is in line with the findings of the previous research stating that the banking sector believes speedy service increases customer pleasure and involvement (Parasuraman et al., 1988). Fast-service systems also stimulate repeat usage. Fast fulfillment and adoption increase customer engagement (Hsu et al., 2015). Reliable service allows self-service banking (Cronin et al., 2000).

Moreover, the findings manifested a positive and significant effect of privacy on customer engagement in self-service banking in Kathmandu. It demonstrates that as the level of privacy develops along with online banking, it promotes the involvement of customers. This finding is in the same direction as the findings of the previous research, depicting that a privacy system and self-service alternatives boost user trust and stimulate consumer engagement. Privacy also increases self-service banking and client engagement (Kim et al., 2022). Furthermore, the findings demonstrate a favorable and considerable impact of security on consumer engagement. It indicates that preserving safety and security, alongside self-service banking, enhances user engagement. This finding is compatible with the findings of the previous research, reflecting that self-banking services improve customer satisfaction and promote participation by improving safety. Thus, financial institutions that provide self-service security enhance revenues and attract clients (Singh et al., 2020). Next, the results indicate a positive and substantial impact of responsiveness on customer engagement, suggesting that an increase in responsiveness within self-service banking enhances the attraction of customers to digital banking. This finding is consistent with the findings of the previous research, revealing that responsive technology services like self-service technology banking increase consumer happiness and recurrent engagement (Zeithaml et al., 2018). Self-service banking that is straightforward and fast may also lessen consumer dissatisfaction (Dabholkar, 2020). Similar to responsive self-service, personalized and targeted interaction may improve client engagement with self-service banking (Lemon & Verhoef, 2016). Finally, the outcome demonstrated that there is a favorable and substantial influence that ease of use has on the level of consumer involvement. Based on this evidence, the percentage of customers who use digital banking services increases when self-service banking is combined with the ability to personalize digital banking and make it easier to use. This finding is in line with the findings of the previous research, depicting that a simplified, user-friendly platform that is compatible with digital transaction systems enhances and maintains online banking usage, which increases customer engagement (Alalwan et al., 2017). The perceived ease of use also affects client participation in self-service banking (Weidlich & Bastiaens, 2017). These traits and self-service banking foster client engagement and retention (Singh et al., 2020).

## V. CONCLUSION & RECOMMENDATIONS

### 5.1 Conclusions

This study focused on evaluating the impact of self-service technology banking on consumer engagement in Kathmandu, Nepal. The research mainly emphasized website attributes, fulfillment, privacy, security, responsiveness, and ease of use associated with the digital banking system and analyzed how these influence users' engagement with self-service technology banking services among the banking clients in Kathmandu, Nepal. The study reflected the supportive contribution of these technology-based banking services in enhancing client engagement. In addition, this research used descriptive statistics such as frequency, percentage, mean, and standard deviation to illustrate the overall features of the respondents' background information. The relationship between the variables was examined by correlation analysis. The result was derived via regression analysis to assess the impact of self-service banking on consumer engagement. The study's findings indicated a favorable and substantial impact of website attributes on consumer engagement in self-service banking. Enhancing the online gateway for digital banking encourages consumers to engage more actively with digital banking services. The banking industry providing digital services must enhance the quality of website features to attract consumers for self-service banking. The results indicated a substantial and favorable impact of fulfillment on customer engagement. This indicates that aligning consumer demands with technology-based services fosters a profound relationship via customer engagement. Consequently, it can be stated that digital banking, by providing online banking services that fulfill customer expectations, encourages clients to increase their engagement in online banking operations. Consequently, banks and financial organizations must prioritize this aspect of digital services. The findings from this study indicated a substantial and favorable impact of privacy on customer engagement. The enhancement of privacy policies for self-service digital transactions establishes a framework that encourages customer participation in the electronic banking system.

The banking industry, offering digitalized and automated services, must ensure the confidentiality of all transactions and user data related to these services to foster consumer confidence and engagement. The findings of this research demonstrated a favorable and considerable impact of security on consumer engagement. An increase in the security associated with online banking services boosts consumer engagement in virtual transactions. It may be inferred that banks must enhance security services and the online transaction system to attract, retain, and engage clients with the self-service banking system. The results indicated a favorable and substantial impact of responsiveness on consumer engagement in self-service banking. An increase in responsiveness enhances client engagement in self-service banking. The banking industry with digital operations must provide prompt responses amid complications encountered by clients in self-service banking systems. The results indicated a substantial and favorable impact of usability on customer engagement in self-service banking. The simplicity of use of digital banking encourages clients to engage in online banking operations. Consequently, it can be inferred that the banking

industry using digital platforms should prioritize user-friendly mechanisms in their services to attract, retain, and provide a comfortable environment for self-service banking, thereby enhancing consumer engagement.

## 5.2 Recommendations

This research's results enhance current theory by providing evidence and may serve as a standard for financial institutions in adopting self-service banking focused on consumer interaction. Moreover, the findings of this research may assist policymakers in considering the dynamic aspects that influence consumer involvement in self-service banking systems. Therefore, the concerned banking industries need to embrace compatible technology-based banking services to spread awareness, enhance customer engagement, and retain valuable clients. Additionally, adequate focus of the regulatory body is essential to formulate policy, implement, and monitor technology-based banking transactions to systematize it, which ultimately enhances client engagement

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