
Moderating Role of Waiting Time on the Relationship between ATM Cash Withdrawals and Customer Satisfaction in Selected Deposit Money Banks in Sokoto Metropolis, Nigeria.

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Abstract

This study investigated the impact of Automated Teller Machine (ATM) services on customer satisfaction in selected deposit money banks in Nigeria, with a focus on the moderating role of waiting time. The research utilized a multi-stage sampling technique, including stratified and purposive sampling. PLS-SEM was employed to test the study's hypotheses. The findings revealed a negative and significant relationship between cash withdrawals and customer satisfaction. Additionally, there was a significant positive relationship between waiting time and customer satisfaction. Furthermore, waiting time was found to moderate the relationship between cash withdrawals and customer satisfaction. Based on these results, the study recommends that Deposit Money Banks (DMBs) in Sokoto metropolis ensure that their ATM machines are consistently stocked with cash to avoid hindrances or disruptions in cash withdrawals by customers. It is crucial for banks to ensure that their ATM machines are operational at all times and dispense cash promptly. Moreover, banks should review and improve the maximum withdrawal limit set for ATMs to enhance customer satisfaction. Addressing issues of debiting customers' accounts without dispensing cash is also important. Lastly, deposit money banks are urged to ensure that all available ATM machines are functional, as this will significantly reduce customer waiting time and improve overall satisfaction.

Keywords: Waiting time, ATM, Cash withdrawals, Customer satisfaction, Deposit money banks

1. Introduction

Automatic Teller Machines (ATMs) have become widely adopted by banks, providing numerous benefits to both banks and customers. ATMs allow customers to access their money instantly, at any time and location, encouraging consistent usage of the service. Sowunmi et al. (2014) assert that ATMs effectively perform the role of cashiers in providing payment services. They serve as electronic equivalents of traditional banking, enabling customers to conduct various financial transactions such as cash deposits, withdrawals, and transfers.

Customer satisfaction is a crucial factor in evaluating service quality before and after usage. It is determined by comparing the perceived outcome of a product or service with

customer expectations. When performance exceeds expectations, customers feel delighted, while meeting expectations leads to satisfaction. Conversely, if performance falls below expectations, customers become dissatisfied (Kotler & Keller, 2016). Customer satisfaction is a key strategy and measurement criterion for businesses (Burodo et al., 2021; Adeniran et al., 2022), reflecting customers' feelings after comparing actual performance to their expectations.

However, existing literature highlights the importance of studying ATM services and waiting time in modern banking operations. Studies on ATM services and waiting time as moderators are limited and lack consistency in their findings. Some studies report a positive association between ATM services and customer satisfaction, including works by Mohammed and Dada (2014), Syed and Khaliquzzaman (2016), Ameer et al. (2016), and Chi and Phong (2015). In contrast, other studies find no correlation between ATM services and customer satisfaction, as seen in Matimbwa and Ochumbo (2018), Charles (2016), and Kumar et al. (2013).

This study aims to address these gaps by utilizing statistical tools, specifically Partial Least Squares Structural Equation Modeling (PLS-SEM), to explore the relationship between ATM services and customer satisfaction. Notably, waiting time will be examined as a moderating variable, an aspect not previously considered in existing literature. While previous studies utilizing PLS-SEM were conducted in Malaysia by Nura (2017) and Yarima (2017), this research focuses on selected Deposit Money Banks in Nigeria.

To guide the study, the following questions were formulated:

1. To what extent does cash withdrawal using ATM significantly influence customer satisfaction?
2. Does waiting time significantly influence customer satisfaction?
3. How does waiting time moderate the relationship between cash withdrawal using ATM and customer satisfaction?

2. Literature Review

This section is divided into four main parts namely: Concept of total quality management, review empirical studies, theoretical review and theoretical framework.

2.1 The Concept of Customer Satisfaction

Customer satisfaction can be defined as a transient emotion or a predisposition that can be influenced by various factors (Burodo et al., 2022; Ahmed et al., 2022). Being customer-driven is crucial for achieving a competitive advantage in the banking industry (Adeniran et al., 2022). Therefore, banks must employ different approaches, such as service re-engineering and task-focused strategies, to ensure customer satisfaction (Syed & Khaliquzzaman, 2016).

2.2 Review of Empirical Studies

In order to establish empirical evidence and identify gaps in the current study, this section provides a review of relevant studies

2.2.1 Empirical Review on ATM Services and Customer Satisfaction

This section presents literature on ATM services and customer satisfaction, aiming to identify existing findings and research gaps.

Several studies have demonstrated a positive relationship between cash withdrawals using ATMs and customer satisfaction. Biset and Bonsa (2019) investigated factors influencing customer satisfaction with ATM usage and found that customers expressed high levels of satisfaction with ATM services. This aligns with the findings of Odusina (2014), who identified a positive and significant association between ATM usage and customer satisfaction. Elliott, Mary, and Akosue (2014) conducted a study on the impact of ATMs

on customer satisfaction in Ghana and found a positive and significant relationship between ATM services and customer satisfaction. These findings are also consistent with the results of Abdulrahman and Premalatha (2015), who reported a positive and significant relationship between ATM services and customer satisfaction.

Moreover, there is a significantly positive correlation between the utilisation of ATMs and the level of customers satisfaction, according to a study by Mohammed and Dada (2014). This is in line with the findings of a study conducted in 2021 by Enyeribe (2019) whose findings showed the impact of Automated Teller Machines (ATM) Services on Customer Satisfaction in Sokoto and Zamfara States of Nigeria.

However, Matimbwa and Ochumbo (2018) conducted a study on the relationship between ATM services and customer satisfaction and found a negative and significant relationship. This is in line with the findings of Enyeribe (2019), which indicated that ATM services did not meet customers' satisfaction.

Considering the mixed and inconsistent findings from previous studies on the direct relationship between ATM services and customer satisfaction, the present study proposes waiting time as a moderator to better understand this relationship (Barron & Kenny, 1986).

2.2.2 Empirical Review on Waiting Time and Customer Satisfaction

Previous studies examining the relationship between waiting time and customer satisfaction have yielded conflicting results. For example, Lahap et al. (2017) found that perceived waiting time positively influenced customer satisfaction in fast food restaurants. Conversely, Ahmed et al. (2017) discovered a negative correlation between waiting time and customer satisfaction in cash withdrawals using ATMs. However, these studies conducted by different authors present inconsistent findings.

2.3 Theoretical Review

This section discusses theories relevant to the impact of ATM services and waiting time on customer satisfaction in the banking industry. The Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT), and Kano Model are applied to justify the choice of this research topic.

The Technology Acceptance Model (TAM) builds upon the Theory of Reasoned Action and serves as a prominent paradigm for investigating the factors influencing users' adoption of technology, as noted by Nikola and Andrina (2015). TAM examines how individuals come to accept and utilize specific technologies (TRA; Ajzen & Fishbein, 1980). It proposes that perceived usefulness and perceived ease of use are fundamental predictors of user acceptance. According to Davis (1989), favorable attitudes and intentions to accept and use technology are influenced by perceived usefulness and perceived ease of use.

TAM considers two behavioral beliefs: perceived usefulness (PU) and perceived ease of use (PEOU), which impact an individual's intention to use technology. Perceived usefulness refers to process expectancy, while perceived ease of use refers to outcome expectancy (Liaw, 2002).

After an extensive review of relevant theoretical models, this study adopts the Technology Acceptance Model (TAM) due to its inclusion of perceived usefulness and perceived ease of use as primary predictors for potential adopters. TAM provides a framework to explain and assess the relationship between ATM services and customer satisfaction. Unlike other models such as the Kano Model, which lack a direct or categorical link to the research need, TAM offers suitable and detailed explanations based on its assumptions, forming the foundation of this research.

3. Methodology

The study employed a survey research design, focusing on the deposit money banks (DMBs) in Sokoto metropolis. Data collection was limited to the ATMs of the banks with the highest number of customers, namely GT Bank (3 branches), UBA (4 branches), Zenith Bank (3 branches), First Bank (5 branches), Eco Bank (2 branches), Access Bank (4 branches), Union Bank (2 branches), Jaiz Bank (1 branch), Polaris Bank (1 branch), and Unity Bank (2 branches). There are a total of 107 ATMs belonging to these ten banks. The population of the study is considered infinite since Nigerian banks allow account holders to use their ATM services regardless of whether they have an account with them.

The study utilized a multi-stage sampling technique, involving stratified sampling and purposive sampling. Primary data was collected through questionnaires, with 384 copies administered and 367 valid responses received from the participants. Descriptive and inferential statistics were used to analyze the data, with descriptive statistics used to describe the respondents' demographic features. The Partial Least Squares Structural Equation Modeling (PLS-SEM) approach was employed to test the hypotheses.

The sample size of 384 was determined using the Krijcie and Morgan (1970) sampling approach for calculating sample size for an infinite (unknown) population, with a 95% confidence level and a Z-value of 1.96. The population proportion (P) was assumed to be 0.5. The formula for calculating the sample size with an infinite population using the Krijcie and Morgan (1970) approach is as follows:

$$SS = \frac{Z^2 P(1-P)}{C^2}$$

Where:

Z = Z value (e.g. 1.96 for 95% confidence level)

P = population proportion (expressed as decimal) assumed to be 0.5 (50%), it is the margin of error

C = confidence level = 0.05

Hence, given P = 0.5, Z = 1.96 and C = 0.05

The above formula returns a sample size of:

$$\begin{aligned} SS &= \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2} \\ &= \frac{3.8416 \times 0.5(0.5)}{0.0025} \\ &= \frac{3.8416 \times 0.25}{0.0025} \\ &= 384. \end{aligned}$$

Table 1: Sample Frame of ATMs users in Each Bank

S/N	Banks	Branches	Number of Functional ATMs	Sample Size
1	GT Bank	i. Bello Way ii. Maiduguri Branch iii. Danfodiyo Branch	4 5 5 (Total=14)	$\frac{14}{111} \times 384 = 50$
2	UBA Bank	i. Aliyu Jodi ii. Kano Road I iii. Kano Road II iv. Danfodiyo Branch	5 6 6 2 (Total=19)	$\frac{19}{107} \times 384 = 68$

3	ZENITH Bank	i. Kano Road 2 ii. Fodiyo Road iii. Emir Yahaya	5 5 2 (Total=12)	$\frac{12}{107} \times 384 = 43$
4	FIRST Bank	i. Abdullahi Fodiyo ii. Kano Road 2 iii. Ibrahim Dasuki Road iv. Kofa Atiku v. Danfodiyo Branch	4 9 5 1 3 (Total=22)	$\frac{22}{107} \times 384 = 79$
5	ECO Bank	i. Kano Road 2 ii. Tsohowar Kasuwa	3 2 (Total=5)	$\frac{5}{107} \times 384 = 18$
6	ACCESS Bank	i. Kano Road 2 ii. Danfodiyo Branch iii. Maiduguri Branch iv. Kano Road I	3 1 4 7 (Total=15)	$\frac{15}{107} \times 384 = 54$
7	UNION Bank	i. Bello Way ii. Market branch	6 2 (Total=8)	$\frac{8}{107} \times 384 = 29$
8	JA'IZ Bank	i. Bello way	1	$\frac{1}{107} \times 384 = 2$
9	POLARIS Bank	i. Maiduguri Branch	5	$\frac{5}{107} \times 384 = 22$
10	UNITY Bank	i. Kano Road 2 ii. Aliyu Jodi	3 3 (Total=6)	$\frac{6}{106} \times 384 = 22$
Total			107	= 384

Source: Researcher field work, 2022

Reliability test was conducted to ensure the quality of the questionnaire and guarantee a scale to produce consistent results. Table 2 presents the test results.

Table 2: Reliability test results of the survey instruments

S/N	Variables	Number of items	Cronbach Alpha
1	Cash Withdrawal	6	0.832
2	Waiting Time	4	0.781
3	Customer Satisfaction	13	0.719
Total Number of items		23	

Source: Researcher field work, 2022

The reliability results of the plot test in Table 2 indicate that the Cronbach's alpha values for cash withdrawal, fund transfer, balance inquiry, waiting time, and customer satisfaction are all above 0.60. This suggests that all the variables are reliable based on the data.

4. Results and Discussion

This section presents the results of the analysis of methodologies, data collection process, response rate of the questionnaires, and demographic profile of the respondents. The PLS-SEM approach was utilized to test the measurement model, which included indicator reliability, internal consistent reliability, convergent validity, and discriminant validity analysis. Additionally, the structural model was used to test the empirical results of the hypotheses.

Table 3: Distribution of Respondents by Occupation

Occupation	Frequency	Valid Percent
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Unemployed	130	35.4
Civil Servant	133	36.2
Trading	48	13.1
Others	56	15.3
Total	367	100

Source: Researcher field work, 2021.

The results in Table 3 indicate that out of the total respondents, 130 individuals (35.4%) were not employed, 133 (36.2%) were self-employed, 48 (13.1%) were involved in trading, and 56 (15.3%) were engaged in other businesses. These findings suggest that civil servants were the primary users of ATM services compared to individuals in other occupations.

Table 4: Distribution of Respondents by their educational qualifications

Educational Level	Frequency	Valid Percent
Primary Certificate	2	0.54
Secondary Certificate	72	19.62
First Degree	218	59.40
Masters Degree	58	15.80
Others specify	17	4.63
Total	367	100.00

Source: Researcher fieldwork, 2022.

Considering the results in Table 4, it can be observed that 2 respondents (0.54%) obtained primary school certificates, 72 respondents (19.62%) have secondary school certificates, 218 respondents (59.40%) obtained first degrees, 58 respondents (15.80%) acquired master's degrees, and 17 respondents (4.63%) have other qualifications such as Diploma, NCE, HND, PhD, etc. These findings suggest that a majority of the customers who patronized ATM services in this study are degree holders.

Table 5: Analysis of respondents' opinions on frequency in using the ATM services

ATM	Frequency	Valid Percent
Daily	53	14.4
Once a week	145	39.5
Once two weeks	100	27.2
once a month	69	18.8
Total	367	100

Source: Researcher field work, 2022.

Table 5 illustrates those 53 respondents (14.4%) use ATM services on a daily basis, 145 respondents (39.5%) use ATM once a week, 100 respondents (27.2%) use ATM once every two weeks, and 69 respondents (18.8%) use ATM services once a month. From these

results, it is evident that the majority of customers in this study utilize ATM services once a week.

4.4 Goodness of Measurement Model

The PLS-SEM analysis was conducted to assess the reliability and validity of the construct measurements, also known as the outer model. According to Hair et al. (2013), the PLS-SEM analysis utilizes two primary criteria to evaluate the quality of the outer model: reliability and validity. In this study, the PLS-SEM algorithm was used, while an outer model was employed to examine the reliability and validity of the construct measurements.

To determine the quality of the outer model, indicators such as indicator reliability, internal consistency reliability, convergent validity, and discriminant validity were considered, following the recommendations of Ramayah et al. (2011). The measurement model, depicted in Figure 1, provides an overview of the PLS-SEM algorithm used in this study.

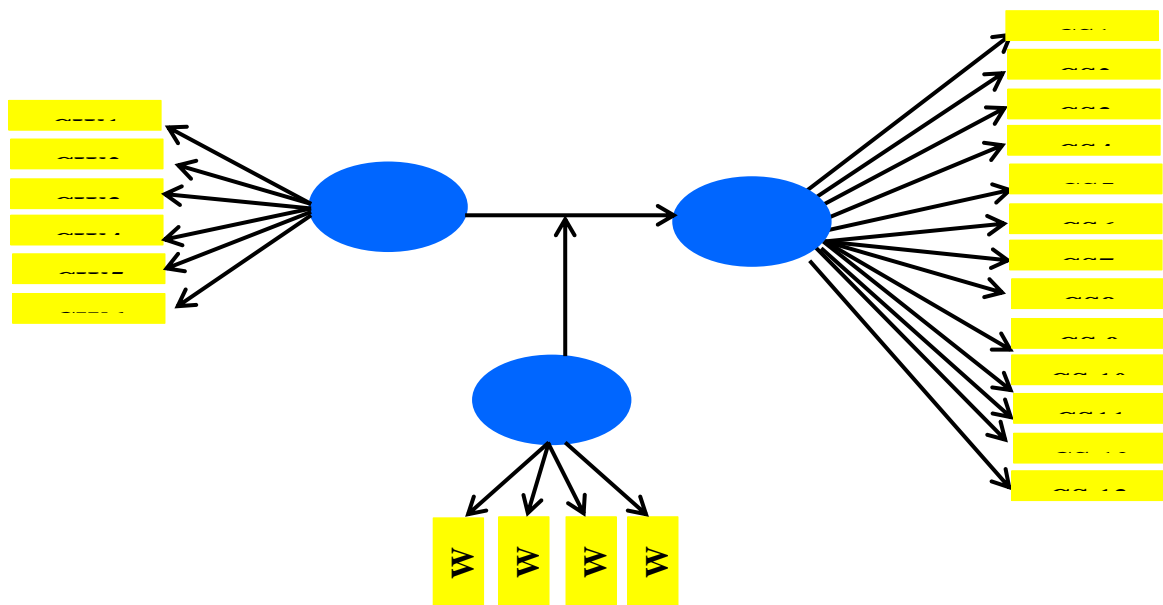


Figure 1: PLS-SEM Algorithm – Complete Direct relationship

Source: Field work analysis 2022.

Figure 1 presents the study's complete model before deletion. The items that have less than 0.4 loadings are deleted based on the rule of thumb.

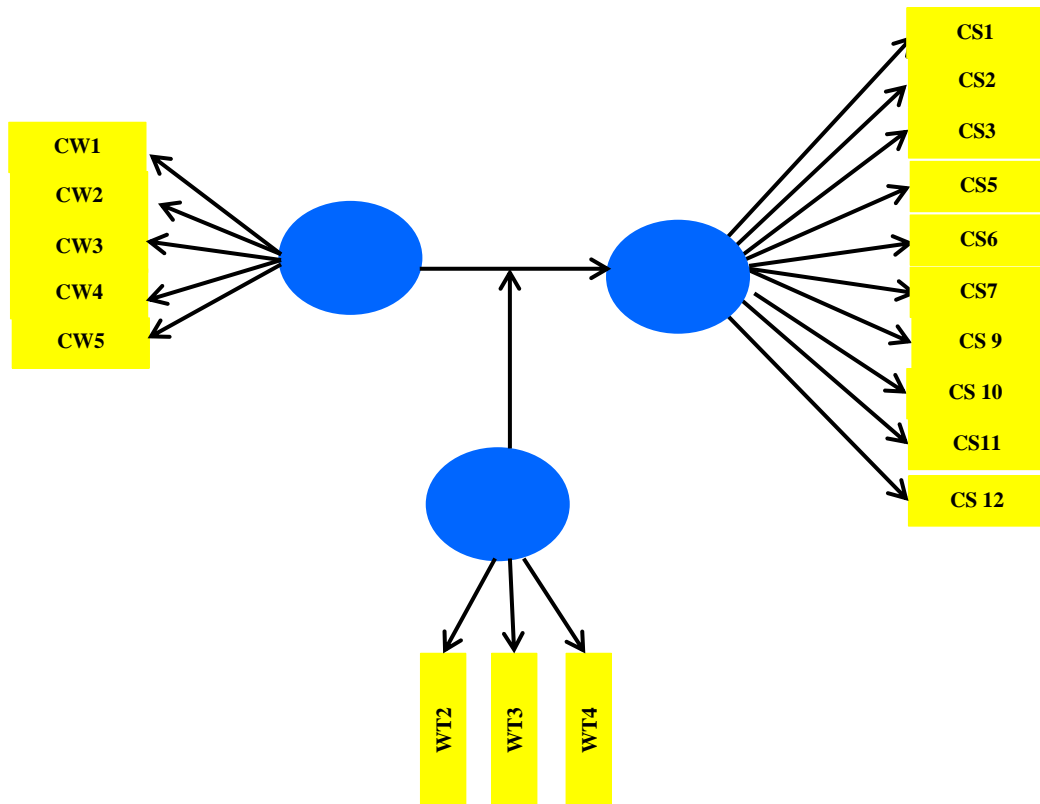


Figure 2: PLS-SEM Algorithms for Measurement Model.

Source: Field work analysis 2022.

Based on Figure 2 of the measurement model, certain items (CW6, WT1, CS4, CS8, and CS13) were excluded from the model to ensure reliability and validity, which are the two primary criteria for assessing the quality of the model (Hair et al., 2010). The purpose of the reliability test is to determine if the measuring instrument consistently measures the intended characteristics. On the other hand, the validity test assesses the extent to which a measure or set of measures accurately represents the concept being investigated.

4.4.1 Indicator Reliability

Through the use of PLS-SEM algorithms, the model was analysed and certain items that did not meet the predetermined criteria were identified and removed. Five out of the total of twenty-three items were eliminated based on these observations. Their removal was not solely due to the failure to meet the threshold of an outer loading value greater than 0.4, but rather because their exclusion improved the values of composite reliability and AVE, which are crucial for this study. As a result, the model now consists of 18 items with loadings ranging from 0.5589 to 0.8203 in Table 7, making them suitable for further investigation.

4.4.2 Internal Consistency Reliability

The reliability of internal consistency is determined by the degree to which the components of a set are positively connected. Both the composite reliability coefficient and Cronbach's alpha coefficient were used to assess the internal consistency reliability of the research's measuring instrument. The results in Table 7 indicate that the composite reliability coefficient exceeds the suggested threshold value of 0.70, as recommended by Hair et al.

(2012, 2013) and Sekaran & Bougie (2010). The Cronbach's alpha coefficient ranges between 0.6345 and 0.9263 in Table 7, demonstrating the reliability of the measurement model.

4.4.3 Convergent Validity

Convergent validity refers to the degree to which a specific measure correlates positively with other measures of the same concept. In this study, convergent validity was evaluated by analysing the outer loadings and AVE values of the indicators. The threshold values of 0.4 and above for outer loadings and 0.5 for AVE values, as suggested by Hair et al. (2011, 2013) and Henseler et al. (2009), were used for evaluation. The findings reported in Table 7 show that after eliminating 5 items, the outer loadings of the indicators met the threshold values of 0.4 and above. Additionally, the AVE values for all the constructs ranged from 0.5050 to 0.6021 in Table 7, exceeding the threshold value of 0.5. Therefore, it can be concluded that the findings provide the necessary evidence for establishing convergent validity.

Table 7: Indicator Loadings and Internal Consistency Reliability

Latent Constructs	Items	Outer Loadings	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)	Items Deleted
Customer Satisfaction			0.9263	0.9271	0.9379	0.6021	CS4
	CS1	0.7280					CS8
	CS2	0.7388					CS13
	CS3	0.8030					
	CS5	0.8203					
	CS6	0.8159					
	CS7	0.8093					
	CS9	0.7790					
	CS10	0.7635					
	CS11	0.7623					
	CS12	0.7322					
Cash withdrawal			0.7502	0.7535	0.8342	0.5050	CW6
	CW1	0.5589					
	CW2	0.7850					
	CW3	0.7846					
	CW4	0.6771					
	CW5	0.7227					
Waiting time			0.6345	0.6452	0.8027	0.5762	WT1
	WT2	0.7206					
	WT3	0.7435					
	WT4	0.8102					

4.4.4 Discriminant Validity

Discriminant validity refers to the extent to which a latent variable is distinct from other latent variables. The Fornell and Larcker criterion, as recommended by Hair et al. (2013) and Henseler et al. (2009), is commonly used to measure discriminant validity. In this study, the discriminant validity is assessed following the guidelines provided by Fornell and Larcker (1981), which involve evaluating the correlations among the components with the square roots of AVE. Additionally, Chin's (1998) approach can be used to determine discriminant validity by examining the indicator loadings and cross-loadings with additional indicators.

Table 8: Latent Variable Correlation and Variance Extracted *Fornell-Larcker Criterion*

Latent Constructs	Cash withdrawal	Customer Satisfaction	Waiting time
Cash withdrawal	0.7106		
Customer Satisfaction	0.4910	0.7760	
Waiting time	0.3617	0.4642	0.7591

Source: PLS-SEM output

Discriminant validity can be established when the outer loading of an indicator on a latent construct is higher than its cross-loadings on other latent constructs (Chin, 1998; Hair et al., 2013). In Table 14, the loadings exceed the cutoff value of 0.5, indicating no concerns with the discriminant validity of this study. Furthermore, in Table 9, the factor loading of each indicator (highlighted in bold) is higher than its cross-loading.

Table 9

Factor loading and Cross loadings

Latent Constructs	Balance inquiry	Customer Satisfaction	Cash withdrawal	Fund transfer	Waiting time
CS1	0.4320	0.7280	0.3674	0.4252	0.3465
CS10	0.4211	0.7635	0.3477	0.3727	0.3603
CS11	0.4662	0.7623	0.4127	0.4427	0.3265
CS12	0.3962	0.7322	0.3718	0.4050	0.3210
CS2	0.4247	0.7388	0.3674	0.4252	0.3732
CS3	0.4401	0.8030	0.3930	0.4624	0.3815
CS5	0.4068	0.8203	0.3795	0.4500	0.3896
CS6	0.4379	0.8159	0.3637	0.4482	0.4110
CS7	0.4740	0.8093	0.4285	0.4623	0.3505
CS9	0.4660	0.7790	0.3725	0.4296	0.3387
CW1	0.4292	0.3696	0.5589	0.5582	0.3468
CW2	0.4405	0.3599	0.7850	0.3234	0.2645
CW3	0.4139	0.3951	0.7846	0.3727	0.2492
CW4	0.3058	0.2777	0.6771	0.2507	0.1917
CW5	0.3086	0.3069	0.7227	0.3038	0.2026
WT2	0.3413	0.3430	0.3655	0.4344	0.7206
WT3	0.2270	0.2966	0.1857	0.2418	0.7435
WT4	0.3284	0.4044	0.2651	0.3396	0.8102

Another method used to investigate discriminant validity, as shown in Table 9, is comparing the item loadings with the cross-loadings. It is evident that all item loadings are higher than the cross-loadings, indicating satisfactory discriminant validity of the test. This suggests that the proposed model is reliable and can proceed with hypotheses testing.

4.4.5 Assessment of the Structural Model Direct Relationship

Once the measurement model (outer model) meets the specified reliability and validity indices, the assessment of the structural model (inner model) can be conducted. This involves evaluating the model's predictive capabilities and its ability to measure relationships between the constructs. The assessment in this study includes the coefficients of determination (R²), effect size (f²), and predictive relevance (Q²) (Hair, Jr et al., 2013; Hair et al., 2010; Anderson & Gerbing, 1988; Barclay et al., 1995).

4.4.6 Coefficient of Determination (R²)

The coefficient of determination (R² value) is a crucial measure for assessing the structural model (Hair et al., 2012; Hair et al., 2011; Henseler et al., 2009). It represents the collective effects of the exogenous latent variables on the latent endogenous variable. In this study, the R² value for the endogenous variable is 0.4436 (see Table 10). However, the satisfactory level of R² value varies depending on the research framework (Hair et al., 2010). A minimum tolerable level of 0.10 R² value is recommended by Falk and Miller (1992) and Hair et al. (2010). Additionally, in PLS-SEM, Chin (1998) considers coefficient values of .67, .33, and .19 as significant, moderate, and weak, respectively. Similarly, according to Cohen (1988), R² values ranging from 0.02 to 0.12 and 0.13 to 0.25 are considered small and moderate, respectively, while values above 0.26 are deemed significant.

Table 10: Coefficient of Determination (R²)

Latent Constructs	R Square	R Square Adjusted	Variance Explained (R ²)
Customer Satisfaction	0.4436	0.4379	44.36%

Source: PLS-SEM output.

The results in Table 10 indicate that the model explains only 0.4436 of the total variance in customer satisfaction. This suggests that 44.36% of the variance in customer satisfaction, as recommended by Chin (1998), is explained by the exogenous constructs, which is considered moderate. Figure 3 and Table 4.12 provide an estimation for the direct relationship, including the moderating variables. The R² value for customer satisfaction is 0.4436, indicating that 44.36% of the variance in customer satisfaction can be explained by cash withdrawals.

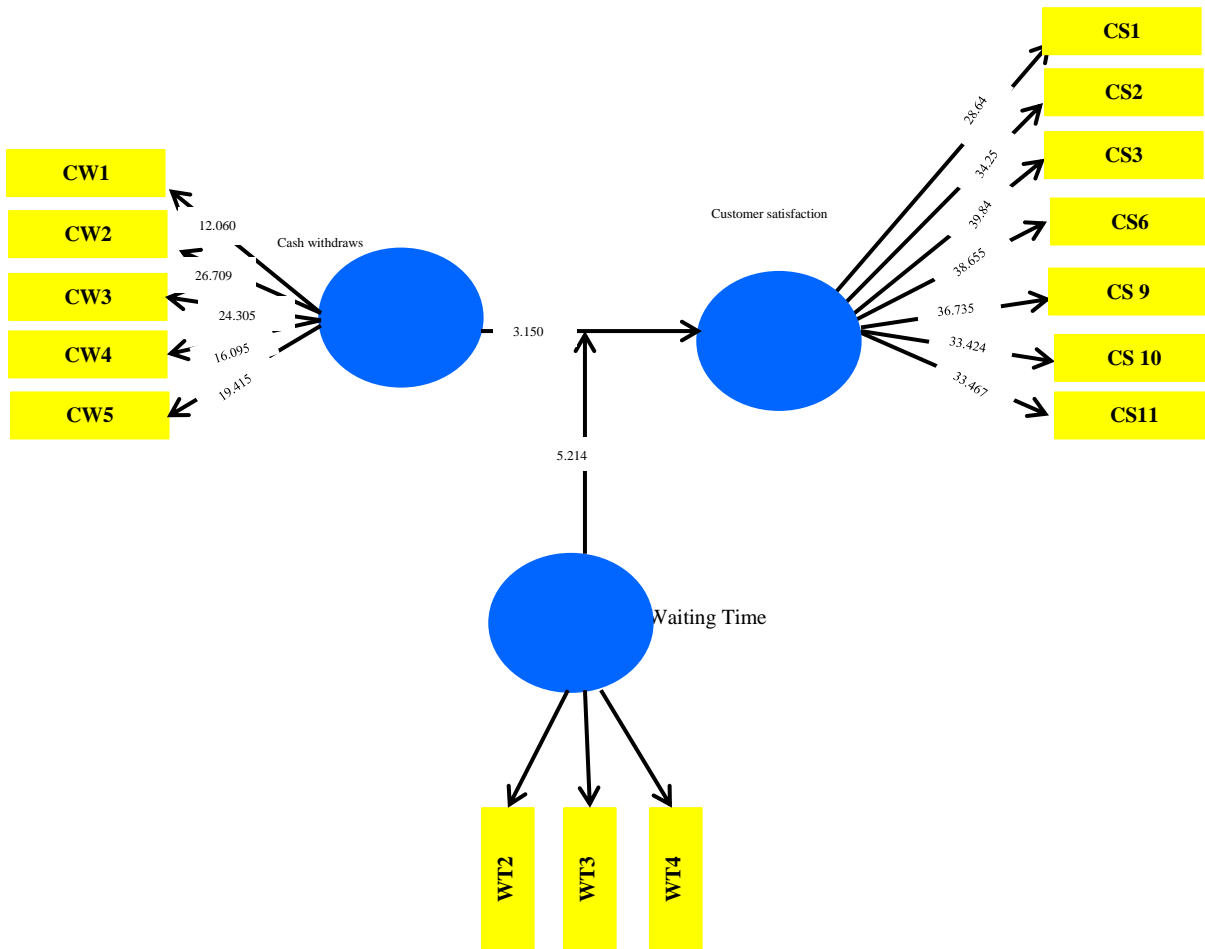


Figure 3: Structural construct
Source: Field work analysis, 2021

Table 11: Results for Direct Relationship Hypotheses Testing

Hypotheses	Path	Beta	Standard Dev.	T Statistics	P Values	95% Confidence Interval of the Direct Effect	Decision
H ₁	Cash withdrawal -> Customer Satisfaction	-0.146	0.048	3.150	0.001	(0.072,0.223)	Rejected
H ₂	Waiting time -> Customer Satisfaction	0.207	0.040	5.214	0.000	(0.143,0.275)	Rejected

Note: **significant @ 0.05

Source: PLS-SEM output.

Based on the results shown in Table 11 and Figure 3, a negative relationship is observed between cash withdrawals and customer satisfaction (Beta β = -0.146, t = 3.150, p < 0.0001).

As a result, H1 is rejected, and the null hypothesis that there is no significant relationship between cash withdrawals and customer satisfaction is accepted. Conversely, a positive relationship is found between waiting time and customer satisfaction (Beta $\beta=0.207$, $t=5.214$, $p<0.0000$). This indicates that waiting time has a significant influence on customer satisfaction. The acceptance or rejection of the hypothesis is based on satisfying the conditions of β and t-value for one-tailed hypotheses.

4.4.7 Assessment of Effect Size (f²)

The evaluation of effect size in this study aims to determine the significant influence of the missing exogenous variable on the endogenous variable represented in the model. Cohen's effect size formula is used to measure the magnitude of impact that exogenous variables have on the model's endogenous variables. According to Cohen (1988), an effect size value of 0.02 represents a small effect size, 0.15 represents a medium effect size, and 0.35 represents a large effect size. However, Chin et al. (2003) emphasize the importance of considering even the smallest effect size of an exogenous variable, as it may still have an impact on the endogenous variables.

Table 12: f Square

Latent Constructs	f Square	Effect size
Cash withdrawal	0.0294	Small
Waiting time	0.0566	Small

Source: PLS-SEM output

The results presented in Table 12 illustrate the effect size of the exogenous variable on the corresponding endogenous variable in the model. Specifically, the table indicates that the effect size of the exogenous variable (CW) on CS is small.

4.4.8 Moderating Effect

The study utilizes the product indicator approach with PLS-SEM to detect and estimate the strength of the moderation effect (Helm, Egger & Gernefeld, 2010; Henseler & Chin, 2010; Henseler & Fasssott, 2010). Following the procedure mentioned above (Chin et al., 2003; Vinzi, Henseler, and Wang, 2010), the moderation model in Figure 4 represents the PLS-SEM bootstrapping testing. Additionally, Table 19 presents the estimates after applying the product indicator approach to examine the moderating influence of waiting time on the association between the exogenous and endogenous latent variables.

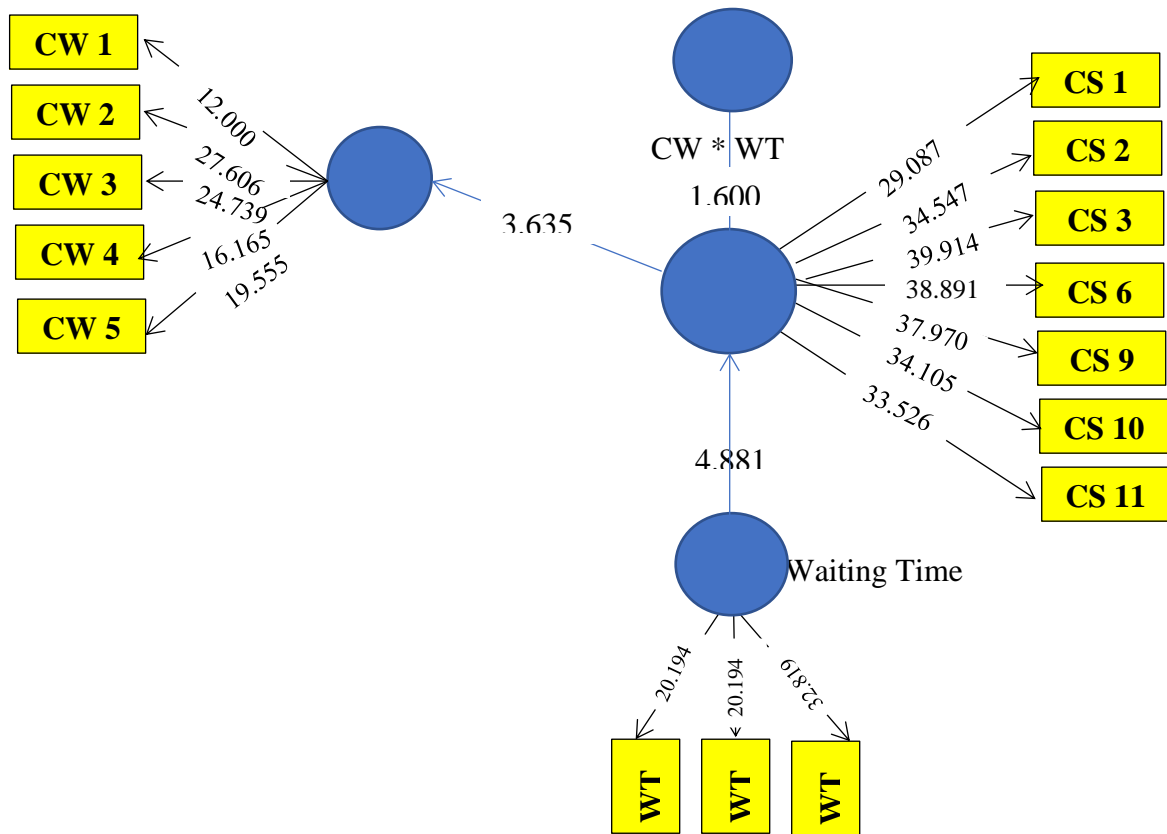


Figure 4. PLS-SEM Bootstrapping-Interactions

Source: Fieldwork analysis, 2023

Table 13: Results for moderation Relationship Hypotheses Testing

Hypotheses	Path	Beta	Standard Dev.	T Statistics	P Values	95% Confidence Interval of the Direct Effect	Decision
H3	CW*WT > Customer Satisfaction	-0.065	0.0400	1.950	0.045*	(0.003,0.136)	Rejected

Source: PLS-SEM output

Figure 4 and Table 13 above present the results of the PLS-SEM bootstrapping analysis, specifically testing the moderation effects of waiting time (WT) on the relationships between cash withdrawal (CW) and customer satisfaction (CS). The figure shows a positive coefficient on the relationship between CW and WT. As a result, the null hypothesis is rejected, indicating a significant positive relationship between CW and WT. The results also indicate that the interaction term CW*WT has a significant effect on CS ($\beta = -0.0650$, $t = 1.950$, $p < 0.045$). This suggests that waiting time negatively moderates the relationship between cash withdrawals and customer satisfaction. Therefore, H5 is rejected.

4.4.9 Assessment of Predictive Relevance (Q²)

Assessing the predictive significance of the structural model is an important aspect of evaluating the model (Hair et al., 2011) [citation needed]. Q² is a measure of how well the model predicts the data of omitted cases (Hair et al., 2014; Chin, 1998). When the Q² statistic is greater than zero, it indicates that the research model has predictive value (Henseler et al., 2009). Furthermore, Henseler et al. (2009) found that higher Q² values indicate a higher predictive significance of the model. The redundancy of the endogenous latent variable (customer satisfaction) determined by cross-validation is presented in Table 20.

Table 14: Predictive Relevance (Q²)

Latent Construct	SSO	SSE	Q ² (=1-SSE/SSO)
WT	2128	2128.	
CS	1330	1026.669	0.228
CW	1330	1330	

Note: WT= Waiting time, CS= Customer satisfaction, CW= Cash withdrawals

From Table 14, the results show that the Q² values for the endogenous latent variable (customer satisfaction) is greater than zero (0.228), thus, implies the existence of the predictive power of the model (Hair Jr. *et al.*, 2013; Henseler *et al.*, 2009).

4.5 Discussion of Results

This study examines the impact of ATM services and waiting time on customer satisfaction in selected deposit money banks in Nigeria. The findings obtained through Partial Least Square Structural Equation Modelling (PLS-SEM) analysis shed light on the extent to which ATM services and waiting time influence customer satisfaction. The study's hypotheses aim to determine the significant effect between ATM services and customer satisfaction, as well as the moderating effect between ATM services and customer satisfaction.

The analysis reveals a significant negative relationship between cash withdrawals and customer satisfaction, with a p-value of 0.0001 at a 5% level of significance. Since the calculated p-value (0.0001) is less than the 5% level of significance, the study rejects the null hypothesis and accepts the alternative hypothesis. This indicates that customers experience significant negative effects on satisfaction during cash withdrawals from ATMs. These findings align with the research of Singh and Komal (2009), Russel (2018), Ranasinghe and Kosala (2017), and Odusina (2014). However, they differ from the findings of Elisabet. K (2016), Gabriel et al. (2015), Fyery (2015), and Biset and Bonsa (2019), which indicate a positive significant relationship between ATM services and customer satisfaction.

The analysis also reveals a significant positive relationship between waiting time and customer satisfaction, with a probability value of 0.0000, which is lower than the 5% level of significance (0.05). This empirical evidence indicates that waiting time has a significant influence on customer satisfaction. These findings support the research of Kumar, Varaprasad, Sridharan, and Unnithan (2013), Lahap, Zlan, Bahri, Said, Abdullah, and Zain (2018), Bielen and Demoulin (2007), and Elliot, Mary, and Akosue (2014), which demonstrate a positive relationship between waiting time and customer satisfaction. However, these findings contradict the studies of Joseph and Simon (2018) and Tom and Lucey (1997), which report a negative and significant relationship between waiting time and customer satisfaction.

In line with the fifth objective, the third hypothesis states that waiting time moderates the relationship between cash withdrawals and customer satisfaction. The results indicate that the interaction term CW*WT is significant in relation to CS ($\beta = -0.0650$, $t = 1.950$, p

< 0.045). Therefore, the study rejects H5 and accepts the alternative hypothesis, which suggests that waiting time moderates the relationship between cash withdrawals and customer satisfaction. However, these findings do not align with the research of Ahmed, Rahman, and Mizanur (2017).

5. Conclusions and Recommendations

Based on the study's findings, the following conclusions can be drawn:

Customers are dissatisfied with the way ATM banks handle their withdrawal services due to issues such as running out of cash, failed transactions, and withdrawal limits.

ii. Customers are satisfied with the waiting time when using ATMs. The positive relationships observed may be attributed to the time-saving nature of ATM transactions compared to traditional counter transactions.

iii. Waiting time moderates the relationship between cash withdrawals and customer satisfaction.

Based on the findings, the study proposes the following recommendations:

Deposit money banks (DMBs) in Sokoto metropolis should ensure that their ATM machines are always stocked with cash to avoid hindrances in cash withdrawals. ATM machines should be capable of dispensing cash at any time to improve customer satisfaction. Additionally, banks should review and adjust their maximum withdrawal limits for ATMs to enhance customer satisfaction.

DMBs should ensure that all their available ATM machines are functional at all times. This will significantly reduce customer waiting time.

iii. Bank management should enforce orderliness among ATM users, following a first-come, first-served approach during cash withdrawals. This will minimize waiting time and prevent customers from switching to other banks for their transactions.

5.1. Policy Implications

The results provide evidence to suggest that in order to prevent obstacles with cash withdrawals, deposit money banks (DMBs) in the city of Sokoto should make sure that their ATMs are constantly stocked with cash. ATMs should be able to dispense cash whenever, to increase customer satisfaction, needed. Moreover, to improve customer satisfaction, banks should also review and adjust their maximum withdrawal limits for ATMs. Furthermore, DMBs are responsible for making sure all of their ATMs are always operational as this will cut down on the amount of time customers must wait. Finally, the study suggested that in order to maintain order among ATM users, bank management should enforce a first-come, first-served policy for cash withdrawals. This will cut down on wait times and stop customers from switching to other banks for their transactions.

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