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IMPACT OF DEBIT CARD TECHNOLOGY ON FINANCIAL INCLUSION: EVIDENCE FROM KADUNA METROPOLIS

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ABSTRACT

Financial inclusion is viewed as a process in which all individuals and investors have easy access to formal financial services. Thus, it plays a vital role in the economic development of any nation through the provision of financial products and services. Drawing from diffusion of innovation theory and transaction cost innovation theory. The study examines the perception of financial included persons regarding the impact of the relationship between debit card technology and financial inclusion. The study tests the impact of debit card technology on financial inclusion using survey research approach and self- administered questionnaire. Data were source from 384 financially included people in Kaduna metropolis. The PLS- SEM analysis revealed that, debit card technology significantly impactaccessibility, usability, and quality of financial products and services in Kaduna metropolis. It was recommended that, similar studies should be done on other factors impacting financial technology, such as SMS, web, and mobile banking.

Keywords: *Financial inclusion, Debit Card, Access, usage, Quality, E-Wallet, Branchless Banking.*

INTRODUCTION

Globally, financial inclusion is very important to the economic growth and development of any nation. Financial inclusion has been identified as one major force for achieving sustainable economic growth by academicians and researchers across globe (Ali *et al.*, 2020). Adeniyi *et al.*, (2023) viewed financial inclusion as the effort to know the customers' needs, financial literacy, counselling, screening and proper monitoring. However, World Bank (2022) sees financial inclusion as the process in which all individuals and investors have easy access to formal financial services. The Bank also viewed it as the efforts by relevant authorities to make financial services and products accessible, available, easily, cheaply and affordably to all individual populace without any form of bias. Financial inclusion influences economic growth, reduce inequality and poverty rate in the country (Odumusor et al., 2024), through its multiple dimensions which are access, usability and quality.

However, access is the capacity to make the use of accessible financial services and products from established or formal financial institutions (Hannig and Jansen 2010 and Serrao et al 2012). At the same time usability is the efficacy and enhancing of financial service and products used (Jansen and Hannig 2010 Serrao el at 2012). Quality is the applicability of financial service or product to the lifestyle wants of the individual's users (Serrao el at 2012 and Hannig and Jansen 2010). Besides, Kama *et al,. (*2013), opine that giving financial access to the hundreds of millions of individual firms all over the globe who are currently financially eliminated would render the possibilities for the formation of a large depository of bank savings, investable capital, investment financing and thus universal wealth creation.

Furthermore, financial inclusion influences economic growth, reduce inequality and poverty rate in the country (Odumusor et al., 2024). Chude and Chude (2022) posited that provision of affordable financial products and services to all members of the society will boost growth of small and medium scale business and increase households' welfare. This can be attributable to implementation of financial inclusion strategies such as increase in number of ATMs, bank branches and mobile money and agent banking in different parts of the country (Odumusor, Acquah & Abiji,

2024, and FSS, 2020). This access to financial products and services would boost financial soundness and security of all adults' individuals and reduce income inequality in the country which would automatically boost inclusive economic growth. Besides, Kaduna state has a total adult of 1,959,267 who are financially eliminated i.e. 5.3% of the total population (EFInA 2014). Moreover, according to Kaduna State Government (2021), the state's policy on financial inclusion encourages opportunities to bring financial inclusion to the 55%. According to the Kaduna State governor El-Rufai during the presentation of the (EFInA survey findings 2021) said, due to low usage of digital financial services there is a need to digitize payments system, and develop a policy on digital financial services such as Debit card, Credit card, and Mobile money to enable cashless payment.

Debit card technology (DC) is a card that enable cashless payments at any time of the day, 24x7 access to funds via automated teller machines (ATMs) and purchases at merchant outlets, prompt settlement of bills payment, and integrated loyalty benefits (Cecilia and Kiran 2024). Debit card provide accessibility for individual users to access electronic payment to the wearer through e-payment services such as PayPal, Vcash, Samsung Pay, Alipay, and other platforms where users can safely perform any monetary transaction (Asira *et al* 2024). However, debit card technologyis also called check cards or bank cards; they can be used to buy goods or Services, or to get cash from an automated teller machine.

Besides, debit cards are one of the most commonly used techniques for withdrawing funds, making payments, transferring money, and having access to other financial products and services conveniently (Cecilia and Kiran 2024).

Moreover, debit card technology are cards that are used to make payments for transactions by direct removal of funds from a certain bank account, that is funds are removed from debit card immediately after the transaction by the cardholder (Mann, 2002). More so, Sanusi Lamido (2010) suggested that, economic advancement would be achieved at a speedy rate if all portions of the individual populace have access to digital financial services. Also, Emefiele (2017) revealed that, DFS has the potential to add about 46 million Nigerians into the formal financial system by 2025.However, despite the availability of digital financial service (DFS); according to Enhancing Financial Innovation and Access (EFInA 2020), in Kaduna State about 38% of it adult populations are financially included and only 28% are actively user of digital store of value i.e. out of 1.5m financially included persons. Despite the noteworthy studies, less attention is paid to assessing the impact of card services technology on financial inclusion in Nigeria: A case study of Kaduna Metropolis.

However, many scholar have used different approaches to measure financial inclusion such as; Stephen and Sibert (2014), Michael (2018), Sunday (2018), Khalid (2016), Stephen and Sibert (2014) used multivariate regression approach and ordinary least squares (OLS) regression method with Statistical Package of Social Sciences (SPSS) without considering smart PLS3-SME for data analysis. Thus, to fill in this gap, the current research study employed smart

PLS3-SME for data analysis. It is in light of the above that, this research study is set out to investigate the impact of debit card technology on financial inclusion: A study on Kaduna metropolis. In order to achieve the objectives of this study the following hypothesis were proposed;

H01: Debit card (DC) has no significant impact on accessibility of financial products and services in Kaduna metropolis.

H02: Debit card (DC) has no significant impact on usability of financial products and services in Kaduna metropolis.

H03: Debit card (DC) has no significant impact on quality of financial products and services in Kaduna
metropolis.

LITERATURE REVIEW

Financial Inclusion

Financial inclusion is the provision of accessibility and availability of financial products and services to the society which influences economic growth reduce inequality and poverty rate in the country (Odumusor et al., 2024). Chude and Chude (2022) posited that provision of affordable financial products and services to all members of the society will boost growth of small and medium scale business and increase households' welfare. This can be attributable to implementation of financial inclusion strategies such as increase in number of ATMs, bank branches and mobile money and agent banking in different parts of the country (Odumusor, Acquah & Abiji, 2024, and FSS, 2020). This access to financial products and services would boost financial soundness and security of all adults' individuals and reduce income inequality in the country which would automatically boost inclusive economic growth.

Access: Refers to the capacity to make the use of accessible financial services and products from established or formal financial institutions (Hannig*et al,.*2010) and (Serrao el at.,2012).

Usage: is the efficacy and enhancing of financial service and products used (Jansen *et al,.*2010) (Serrao el at 2012).

Quality: This refers to the applicability of financial service or product to the lifestyle wants of the individual's users (Serrao *et al* 2012) and (Hannig*et al,.*2010).

Debit Card Technology

Debit cards are one of the most commonly used techniques for withdrawing funds, making payments, transferring money, and having access to other financial products and services conveniently (Cecilia and Kiran 2024). Debit cards is a card that enable cashless payments at any time of the day, 24x7 access to funds via automated teller machines (ATMs) and purchases at merchant outlets, prompt settlement of bills payment, and integrated loyalty benefits. (Cecilia and Kiran 2024). However, debit card can also provide accessibility for individual users to access electronic payment to the wearer through e-payment services such as PayPal, Vcash, Samsung Pay, Alipay, and other platforms where users can safely perform any

monetary transaction (Asira 2024 *et al*). Furthermore, debit card is a device that enables individual card holder, to carry out business transactions in different locations, and pay directly by debiting from the card holder bank account. It is very important to protect this card since it is connected to the individual card holder bank account, which is why the user manages his own money (Asira 2024 *et al*).

Mobile Money Wallets: refers to an application on a device (i.e. mobile device) which can firmly or tightly relate with digital store of value Mobey Forum (2011). For instance, POS mainly consists of a phone app that attaches to a card reader.

E-wallet: is a digital wallet which allows users to make electronic commerce transactions quickly and securely. Also, E-wallet provides all of the functions of wallets on one smart card and when using e-wallet Identification is required for every debit/credit card transaction and the card is equipped with a disabling device if the card should be tampered with Abhay Upadhayaya (2012).

Branchless banking: This is a technological innovations such as card reading point of sales (POS), mobile phones or smartphone devices used by either retail banking agent, third party intermediaries or personal phones or computer devices, to deliver financial services to individual firms out of the traditional bank branches for business dealings Consultative Group to assist the poor (United Nations) (2016).

Review of Empirical Studies

This research study reviewed the empirical studies of several researchers that are done or carried out on the basses of the impact of debit card on financial inclusion. For instance, Sunday (2018), conducted a research on the empirical assessment of the effects of cashless policy on financial inclusion in the Nigerian emerging economy. Objective of the study is to examine the effects of cashless policy on financial inclusion in the Nigerian emerging economy. The study employs the ordinary least squares and correlation matrix as estimation methods. The findings reveal that, the cashless policy maintained a non-significant relationship with financial inclusion both in urban and rural areas of Nigeria. Also, the findings show that the cashless policy had a significant effect on increasing customers' deposits in commercial banks of Nigeria. The study dwell so much on branches of commercial banks and ATM centers/outlets, POS and web base technique with special reference to branches of commercial banks and ATM centers/outlets without regarding the debit card (DC).

Research conducted by (Lasisi&Abubakar2014), on an empirical study of automated teller machine (ATM) and user satisfaction in Nigeria: A study of united bank for Africa in Sokoto metropolis. The objective of this study was to measure the satisfaction of customers as regards to ATM services. Data was analyzed by use of multiple logistic regression analysis. The findings revealed that, the impact of ATM services in terms of their perceived ease of use, transaction cost and service security is positive and significant. However, the result also indicates that the impact of ATM services in terms of availability of money is positive but insignificant. The research talks so much on ATM without considering the debit card (DC).

Research conducted by Kangni and Mihasonirina (2012), on Mobile Phones, Financial Inclusion, and Growth. The objective of the study is to investigate whether mobile phone development fosters economic growth through better financial inclusion. Data were analyzed

using multivariate regression approach employing Statistical Package of Social Sciences (SPSS). The findings of this paper underline the importance of mobile phone rollout for African countries. The research talks so much on the economic growth through better financial inclusion with reference to mobile phones without considering the debit card (DC).

Stephen and Sibert (2014), conducted a research on the impact of mobile banking on financial inclusion in Zimbabwe: A Case for Masvingo province. The main objective of the study is to evaluate the impact of mobile banking as a financial inclusion strategy. The sub objectives of the study are to find out whether mobile banking products meet the needs of the vulnerable groups in terms of affordability, convenience and accessibility. Data were analyzed using multivariate regression approach employing Statistical Package of Social Sciences (SPSS). The findings revealed that the low-income people are willing to adopt mobile banking and the reasons are that, it is easily accessible, convenient, cheaper, easy to use and secure. The research dwell so much on the economic growth through better financial inclusion with reference to mobile phones without considering the debit card (DC).

Michael (2018) conducted a research on the nexus between internet penetration and financial inclusion in Nigeria. Data were analyzed using OLS regression method employing Stata 13 and data was tested for empirical evidence using Two-staged regression analysis in E-views 10. The findings revealed that, internet penetration has significant impact on financial inclusion in Nigeria. The research dwell so much on the internet penetration without considering the debitcard (DC).

Underpinning Theories

The theories and framework or models on invention or innovation acceptance which edify this research are: Diffusion of Innovation Theory of Everett Rogers (2003) and transaction cost innovation theory of I licks and Niehans (1983).

Diffusion of Innovation Theory

Diffusion of invention or innovations theory was suggested by Everett Rogers in (2003). The theory tries to analyze why, how and at what grade new concepts and technology expands. According to Rodgers (2003), diffusion is the means or procedures in which a creation or innovation is disseminated beyond the regular time among the players in a social-processes. Rogers (2003), proposed five characteristics in the theory of invention or innovation which includes the followings: First characteristic which is relative advantage show the extension of technological creation or innovation beyond the old, former or previous creation or innovation. Second characteristic is compatibility. Compatibility is the fitness of technological invention or innovation with the acceptance wants or needs, acceptance exposure, and acceptance value. The third characteristic is complexity which refers to the level of complication or difficulty of understanding and the use of technological creation or innovation. The fourth characteristic is trialbility which refers to the level in which financial creation or innovation can be tested and trusted. The fifth characteristic is observability which means the level in which the outcome of acceptance of technological invention or innovation is noticed and informed.

The Transaction Cost Innovation Theory

The transaction cost invention or innovation theory's main innovators are: Hicks and Niehans in (1983). However, according to Hicks and Niehans (1983), argued that, the main cause of financial invention or innovation is the cost reduction in transaction dealings and in reality, advancement in technology is the cause of financial technological creation or innovation and this innovation leads to cost reduction in transaction dealings in digital financial products and services

Research Methodology

Sample and Data Collection

The given study, through self-administered questionnaires, collected data from four LGAs (Kaduna North, Kaduna South, Igabi and chukun). Questionnaires were distributed among financial included person's across the four local government mentioned above. This unit holds 555,000 financial included person's which is the populations of this study are. The sample size of 384 respondents from Kaduna metropolis was chosen. The reason for chosen Kaduna metropolis is due to the heavy population density, as well as high concentration of electronic banking services in the metropolis. The researcher asked the respondents viewpoint on 5point Liker scale score, ranging from 1 strongly disagreed to 5 strongly agreed on score such as "Do you have complete trust in making payments using debit card". Items operationalized to measure debit card were rated based on 5 points Liker scale. Here the answerers are required to voice their level of disagreement, agreement or neither agree not that is (1 strongly disagreed and 5 strongly agreed) and questions such as "Are you satisfied when making payment using debit card" were asked.

The determination of the number of respondents for each of the LGAs was done proportionately as follows:

$$\text{No of Respondents} = \frac{\text{Population of each LGA}}{\text{Total population of the 4 sample LGAs}} \times \text{sample size}$$

Results and Discussion

This section shows the descriptive statistics involving minimum, maximum, mean, and standard deviation for items in the constructs. Moreover, answerers' responses were collected on Likert scale with supports from 1 to 5, where 1 is strongly Disagree and 5 is strongly Agree. Besides, Table 1 present the descriptive analysis for DC, QTY, ACC, and USG.

Table 1Descriptive Statistics for DC,QTY, ACC, and USG.

		Minimum	Maximum	Mean	Std. Deviation
DebitCard	DC	1	5	3.71	1.11
Quality	QTY	1	5	3.68	1.05
Accessibility	ACC	1	5	3.91	0.98
Usability	USG	1	5	3.98	0.92

Source: *Researcher's computation*

From the above Table 1, the mean score and std. deviation of the constructs or latent variables (DC, QTY, ACC, USG) range from 3.68 to 3.71 with a standard deviation ranging from 0.92

to 1.11 respectively. In specific, the independent variable DC had a minimum value of 1 and maximum value of 5 with mean value of 3.71 which is the same with the scale of four (4) agree and std. deviation of 1.11 which depict variance of one (1) respectively. However, this shows that, majority of the respondents are of the opinion that DC services is satisfactory. Furthermore, regarding the dependent variables, QTY, ACC and USG in Table 1, had a minimum value of 1 and maximum value of 5 with a given mean value of 3.68, 3.91 and 3.98 which are the same with the scale of four (4) agree and std. deviation of 1.05, 1.98 and 0.92 which depict variance of one (1) respectively. Though, this shows that, majority of the respondents are of the opinion that there is accessibility, quality, and usability of services.

Assessment of Measurement Model

Measurement of outer model analysis the relationships between the indicators and their respective constructs or latent variables (Hair et al., 2014) (Henseler*etal*,.2016) (Sarsted*t et al*.,2016). However, in this research study, the measurement model has been appraised based on its reliability and validity. Besides, using the PLS-SEM as statistical means for the present study, the measurement scales accepted evaluates individual indicator reliability, internal consistency reliability, convergent validity and the discriminant validity of the indicator or construct relations. Figure 1 and Table 2 shows the measurement model.

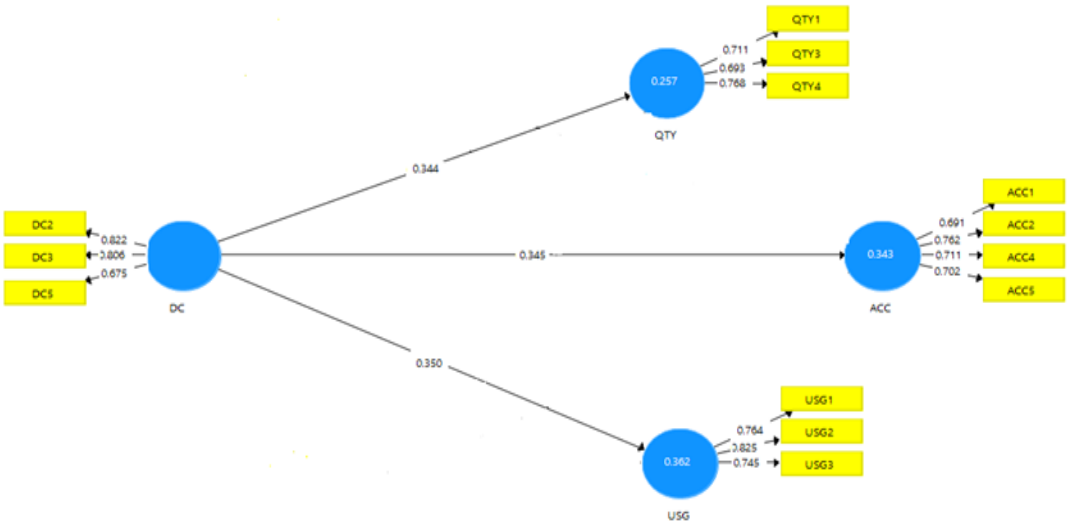

Figure 1 Measurement Model

Table 2*Measurement Model Results*

Construct and Indecators	**Loadings**	**Composite Reliability**	**Average Variance extracted (AVE)**
Accessibility			
ACC1	0.691	0.809	0.515
ACC2	0.762		
ACC4	0.711		
ACC5	0.702		
DebitCard			
DC1	0.822	0.813	0.594
DC2	0.806		
DC5	0.675		
Quality			

QTY1	0.711	0.768	0.525
QTY3	0.693		
QTY4	0.768		
Usage			
USG1	0.764	0.822	0.607
USG2	0.825		
USG3	0.745		

Source: *Researcher's computation*

From the above Table 2, individual indicator reliability was measured by studying the outer loadings of the latent variable Byrne (2004) (Hair Ringle, &Sarstedt, 2014) Hulland (1999). The standard range values of 0.5 to 0.7 are the acceptable values for indicator reliability proposed by Byrne (2004) and (Hair, et al., 2014). Thus, from Table 2above the outcome of the loading of the 13 items fall between the range 0.5 and 0.8 this exceeded 0.7 as the threshold which is satisfactory. Secondly, the threshold for Cronback's Alpha and composite reliability result is 0.70 or higher as suggested by Baggozzi (1988) and Hair et al (2014), in this research study the composite reliability coefficient approach was used to evaluate the internal consistency reliability and the result of the composite reliability for each construct or latent variable in Table 2above falls within the range 0.763 to 0.822, which is above the standard minimum threshold of (0.70) which is satisfactory. Thirdly, Convergent validity was verified using the average variance extracted (AVE) Fornell & Larcker, (1981) hold that, the threshold for AVE should be at least 50% (0.5) and in Table 2 above, all the AVE exceeded 0.5 which is satisfactory. Fourthly, this present study used Fornell & Larcker Criterion (1981) to ascertain discriminant validity see Table 3 below.

Table 3Results of Discriminant Validity Test (Fornell-Larcker Criterion)

	ACC	**DC**	**QTY**	**USG**
ACC	0.717			
DC	0.510	0.771		
QTY	0.399	0.453	0.725	
USG	0.585	0.521	0.386	0.779

Source: *Researcher's computation*

Discriminant validity as presented in Table 3 above shows that, discriminant validity values were achieved, because the square root of the AVEs were higher and greater than the correlation between the latent or constructs variables which is satisfactory.

Structural Model

After reviewing the standard of the measurement model, this section advanced to the assessment of structural model. However, inner model or structural model as the name implies, shows the relationship among the theoretical constructs or latent variables Chin (1988) (Sarstedt et al., 2016). Though, as revealed by current literature on PLS path modeling, the current research study shows the outcome of the results of the inner model through measuring the significance and relevance of the structural path coefficients and the level of R-square (coefficient of determination) (R^2). Therefore, Figure 2 and Table 4below show the conclusions of the full structural model for this research study.

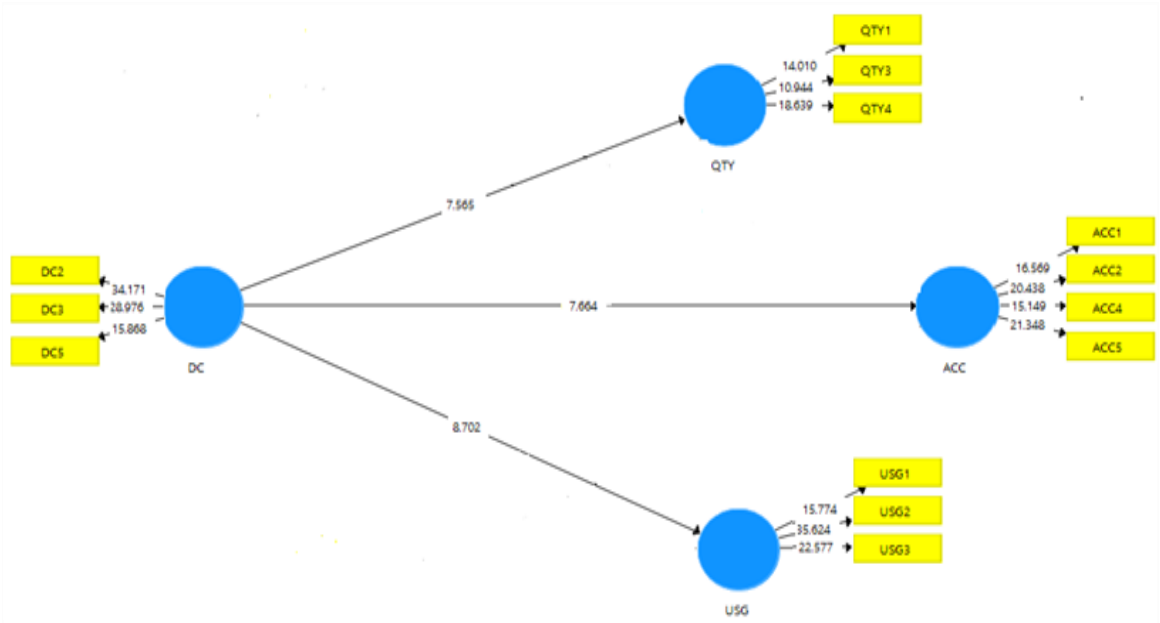

Figure 2 ***Structural Model***

Significance and Relevance of the Structural Path Coefficients

The structural model, modeled relationship i.e. the path coefficients represent the hypothesized relationship among the latent variables or constructs. However, the acceptable value of the path model is between -1 and +1 (Hair et al., 2014). From figure 2above, the arrows value connecting the independent latent variable to the dependent latent variable (i.e. QTY, ACC and USG represent the T-values). The outcome of the result show significant relationship between all the variables based on the significance level of 5% (0.05) error probability and critical t-value of 1.96 in respect of two-tailed test. Thus, pointing out to significance of the structural path coefficients of hypotheses postulated for the present research study, the results of each significance and their findings are presented in Table 4

Table 4*Results of Structural Model*

Hypothesis	Relationship	Beta	SE	t-value	p-value	Findings
H1	DC-> ACC	0.345	0.045	7.664	0.000	Not Supported
H2	DC-> QTY	0.344	0.046	7.565	0.000	Not Supported
H3	DC -> USG	0.350	0.040	8.702	0.000	Not Supported

Source: Researcher's computation

Based upon the theoretical framework of the research study, Three (3) hypotheses were posited in which all the 3 were statistically significant. However, it could be recalled at the beginning that, Hypothesis 1 predicted that, DChas no significant impact on ACC. Therefore, as indicated in Figure 2 and Table 4, there exist a significant impact between DC and ACC. That is, (β = 0.345, t = 7.664, p< 0.000). Consequently, Hypothesis 1 not supported. Conversely, Hypothesis 2 predicted that, DChas no significant impact on QTY. Still, as indicated in Figure 2 and Table 4, there exist a significant impact between DC and QTY. That is, (β = 0.0344, t = 7.565, p< 0.000). Thus, Hypothesis 2 not supported. Lastly, Hypothesis 3 predicts that, DC has no significant impact on USG. However, as indicated in

Figure 2 and Table 4, there exist a significant impact between DC and USG. That is, ($\beta = 0.350$, $t = 8.702$, $p < 0.000$). Thus, Hypothesis 3 not supported.

Assessing the Level of R-square (R2)

Evaluating the R-square level also point out testing the coefficient of determination. However, the outcome of the variance is said to range between 0 and 1, with value closer to 1 indicating high level of predictive certainty and vise-versa. Therefore, Falk and Miller (1992) proposed that, for variance explained for a particulardependent (endogenous) contracts to be seen as sufficient, R-square value should be equal to or higher than 0.10. Thus, as shown in Table 5 below, the R-square value for the main outcome of the PLS model was 0.343, 0.257, and 0.362. Though, this proposed that, the independent (exogenous) variables for this study collectively explained 34% (34% adjusted), 26% (25% adjusted), 36% (36% adjusted) of the variance in ACC, QTY and USG.

Table 5Results of Variance Explained - Coefficient of Determination

	R Square	**R Square Adjusted**
ACC	0.343	0.338
QTY	0.257	0.251
USG	0.362	0.357

Researcher's computation

Recommendations

The financial institutions should ensure that, the financially included individuals have easy accessibility to financial products and services and to improve quality of financial products and services to enhance usability of such products and services, and also to inform, educate and enlightened financial included person's about the digital financial products and services to enhance financial inclusion.

Suggestion for Further Studies

The research study recommended that, similar studies should be done on other factors impacting financial technology, such as SMS banking, internet/web banking, and mobile banking. Also, longitudinal research design approach may be explored in future research, to detect and provide insights into changes over time. This may serve as an advantage over the present study that adopted a cross-sectional design, with causal inferences that could not be made to the population. In addition, the model for this study explained 34% (34% adjusted), 26% (25% adjusted), 36% (36% (R2- see Table 4) this depicts that more studies are needed to uncover more debit card contingencies.

Conclusion.

The main objective of this study is to find out the impact of the relationship between debit card (DC) and financial inclusion (ACC, QTY, and USG) in Kaduna metropolis. Though, sketching from the succinctly itemized gaps based on the review of literature, the research finding reveals that debit card significantly impact financial inclusion (ACC, QTY, and USAG) in a specific manner. These results however, underscore the importance of debit card as an important factor to be considered in ensuring financial inclusion.

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