

Mobile money adoption and usage and financial inclusion: mediating effect of digital consumer protection

George Okello Candiya Bongomin and Joseph Mpeera Ntayi

Abstract

Purpose – Drawing from the argument that mobile money services have a significant potential to provide a wide range of affordable, convenient and secure financial services, there have been rampant frauds on consumers of financial products over the digital financial platform. Thus, this study aims to establish the mediating effect of digital consumer protection in the relationship between mobile money adoption and usage and financial inclusion with data collected from micro small and medium enterprises (MSMEs) in northern Uganda.

Design/methodology/approach – To achieve the main objective of this study, a research model was developed to test for the mediating effect of digital consumer protection in the relationship between mobile money adoption and usage and financial inclusion. The data were collected from MSMEs and structural equation modelling in partial least square (PLS) combined with bootstrap was applied to analyze and test the hypotheses of this study. The direct and indirect effect of mobile money adoption and usage on financial inclusion was tested through digital consumer protection as a mediator variable.

Findings – The findings from the PLS-structural equation modelling (SEM) showed that mobile money adoption and usage has both direct and indirect effect on financial inclusion. Moreover, financial inclusion is influenced by both mobile money adoption and usage and digital consumer protection.

Research limitations/implications – The study used partial least square (PLS-SEM) combined with bootstrap confidence intervals through a formative approach to establish the mediating effect of the mediator variable. Hence, it ignored the use of covariance-based SEM and the MedGraph programme. Furthermore, data were collected from samples located in Gulu district, northern Uganda and specifically from MSMEs. This limits generalization of the study findings to other population who also use mobile money services.

Practical implications – Promoters of digital financial services, managers of telecommunication companies, and financial inclusion advocates should consider strengthening the existing digital consumer protection laws on the mobile money platform. A collaborative approach between the mobile network operators, financial institutions and regulators should tighten the existing laws against mobile money fraudsters and an efficient mechanism for recourse, compensation and remedy should be set up to benefit the victims of frauds and cybercrime on the Fintech ecosystem.

Originality/value – The current study gives a useful insight into the critical mediating role of digital consumer protection as a cushion for promoting financial inclusion through mobile phones over the Fintech that face great threat and risk from cyber insecurity.

Keywords Mobile money services, Digital consumer protection, Financial innovation, Financial inclusion, Cyber insecurity, Fintech ecosystem

Paper type Research paper

George Okello Candiya Bongomin is based at Faculty of Graduate Studies and Research, Makerere University Business School, Kampala, Uganda. Joseph Mpeera Ntayi is based at the Department of Management science, Makerere University Business School, Kampala, Uganda.

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Background

Numerous studies have shown that micro small and medium enterprises (MSMEs) form a large part of the private sector in both developed and developing countries. This contributes greatly to economic growth and poverty alleviation mostly in developing

countries (Ayyagari *et al.*, 2005). According to Beck *et al.* (2005), MSMEs create over 60 per cent of the total jobs that partly solve the lack of employment and income inequality rampant in developing countries. Accordingly, to survive and grow to create more jobs and contribute to economic development, MSMEs require finances through financial inclusion (Beck and Demircuc-Kunt, 2006; Organization for Economic Corporation and Development, 2017).

According to the United Nations Development Programme (UNDP, 2006), financial inclusion refers to a customer having access to a range of formal financial services from simple credit and saving services to the more complex services such as insurance and pension. Mobile money generally refers to payment services operated under financial regulation and performed from or via a mobile device. Succinctly, the World Bank (2008) suggests that the availability of wide range of financial services is very vital for MSMEs because it helps them to generate income, build assets, smoothen consumption and manage risk.

While the recent World Bank Global FINDEX data (2017) indicates that access to financial services has increased globally, substantial evidence still shows that MSMEs have less access to formal sources of external finance (European Commission, 2017a). Karanth and Dongre (2018) observe that MSMEs in developing countries lack access to adequate finance due to the absence of bank branches in rural areas where they operate. This is because of the high cost of operation involved in providing small loans to MSMEs. Indeed, the International Finance Corporation (IFC, 2018) argues that a novel Fintech channel such as mobile money services can offer a financial solution to make financial services more accessible to the self-employed micro entrepreneurs in underdeveloped markets where the banks are absent. The M-PESA success story in Kenya demonstrates the potential of mobile phone technology in supporting the extension of access to financial services to micro-enterprises in developing countries (Morawczynski and Pickens, 2009; GSMA, 2015).

However, whereas the mobile money technology has shown phenomenal stride towards extending financial services to MSMEs located in the rural areas in developing countries, scholars like Njoroge (2016), Kikulwe *et al.* (2014) and Mugambi *et al.* (2014) argue that digital consumer protection remains an issue of concern. Specifically, Villasenor *et al.* (2015) observe that lack of transparency and fraud stemming from mobile money operators and telecom companies have led to unwillingness by individuals to participate in the mobile money sector. Besides, the lack of interoperability between various mobile payment interfaces has raised concerns over privacy and security when confidential details are shared through fragmented versions of mobile payment platforms (Mazer and Mckee, 2017). Furthermore, the key technologies used over mobile phones like short message services (SMS) and unstructured supplementary service data (USSD) also have known security weaknesses that could be exploited to intercept mobile money transactions.

Consequently, the World Bank (2012a, 2012b, 2012c) has advocated for consumer protection to ensure that consumers' data are protected over the mobile money platform and enough information is provided to users with access to recourse mechanisms to resolve disputes. Similarly, the Alliance for Financial Inclusion (2014) states that protecting consumers from transaction risk and ensuring that they understand the mobile money products, may increase their confidence and trust in the mobile money systems. This could result into increased mobile money adoption and usage.

Contextually, while the Government of Uganda has instituted and implemented policies such as anti-money laundering, countering the financing of terrorism, interoperability, mobile network operators' (MNOs) effectiveness and transparency over the mobile money platform, digital consumer protection remains a challenge. This stems from the sharing of customers' data and personal identification numbers (PINs) with fraudsters, ineffective complaints handling and consumer recourse and unresolved solution to misdirected

transactions over the mobile money platform. Additionally, the mobile money policy implementations are also ore skewed towards the supply side than the demand side.

Against this backdrop, the current study is motivated by the unwillingness by individuals to participate in the mobile money sector due to lack of transparency, insufficient cyber security, operational and technical risks, questionable integrity of MNOs staff, insufficient information on digital financial services, lack of data privacy and the deficiency on the mediating effect of digital consumer protection in the relationship between mobile money adoption and usage and financial inclusion in developing countries.

Literature review and hypotheses development

Mobile money adoption and usage and financial inclusion: the mediating effect of digital consumer protection

Theoretical underpinning. The restricted access/limited control (RALC) theory of privacy by [Moor \(1990 and 1997\)](#) posits that in setting up contexts or zones of privacy to limit or restrict others from access to one's personal information, strict control should be implemented. The privacy policies that protect information in a particular situation by normatively restricting others from accessing that information provide individuals with limited controls. The adoption of RALC helps to frame an online privacy policy that is sufficiently comprehensive in scope to address a wide range of privacy concerns that arise in connection with digital transactions. Thus, the adoption of digital consumer protection stipulated under the RALC can create conducive environment for transactions over the mobile money platform to promote financial inclusion.

According to the [Alliance for Financial Inclusion \(2014\)](#), although the mobile money services have shown great potential to advance financial inclusion, the image of mobile financial service providers, levels of consumer trust and the value proposition of the services offered, influences the uptake of the mobile money financial products and services. The use of mobile money financial services and agent banking introduces new operational and technical risks such as new forms of fraud and inappropriate product design and system failures. Qualitative surveys in nine countries by [McKee et al. \(2015\)](#) reveal that when consumers perceive or encounter problems within mobile money systems that exposed them to risk, it decreases their trust, uptake, and use of the services. A review conducted by MicroSave on consumer concerns in Bangladesh, the Philippines and Uganda reports that Digital Financial Service customers are primarily concerned with service downtime, agent illiquidity, fear of sending money to the wrong number and the charging of unauthorized fees by agents ([Wright, 2015b](#)).

Thus, the [World Bank \(2012a, 2012b, 2012c\)](#) argues that consumer protection on the mobile money platform should ensure that consumers have enough information to make informed financial decisions with availability of access to recourse mechanisms to resolve disputes to prevent unfair practices by mobile money services' providers. [Mazer and Garg \(2016\)](#) observe that the provision of effective complaints recourse channels with trained staff conversant in handling fraud and other complaints and dedicated recourse channels for agents, can help to reassure users of new financial services that their money is protected and they are able to resolve issues if they encounter a problem with the mobile money services' providers.

Additionally, [Prathap and Khaitan \(2016\)](#) also suggest that encouraging better choice, pricing and tailoring of offerings to customer circumstances including an obligation that lenders accurately assess individual consumers' needs and capacities and sell only those products that are appropriate and meet the needs of particular consumers, are important in promoting financial inclusion through the mobile money services. Mobile money providers

should ensure that the products they sell are appropriate, adequately suited to the consumers' needs and circumstances and delivered in a responsible fashion.

The [Consultative Group to Assist the Poor \(CGAP, 2017\)](#) further elucidates that comprehensive fraud awareness and prevention programmes that providers offer to sensitize consumers, staff and agents on fraud trends and prevention measures can greatly improve mobile money services' uptake. Indeed, [Mazer et al. \(2016\)](#) found that disclosing loan terms and conditions to customers borrowing through the KopaCash offered by the Jumo mobile money resulted into reduced defaults among the borrowers in Kenya. Thus, here we hypothesize that:

H1. Digital consumer protection significantly mediates the relationship between mobile money adoption and usage and financial inclusion of MSMEs in northern Uganda.

Digital consumer protection and mobile money adoption and usage

According to [CGAP \(2017\)](#), consumer protection refers to an essential element of inclusive financial systems, which ensures that current users of formal financial services get transparent and fair treatment in the market so as to instil confidence regarding the formal financial services and the providers among the potential consumers.

[Caruana \(2016\)](#) observes that the wide use of digital technologies such as mobile money increases the pervasiveness and scale of cyber-attacks that pose significant threat to the security and privacy of customers' data on the digital channels. Similarly, customers' awareness that their data is prone to cyber-attacks has made them lose trust in the digital channels to perform their transactions.

Consequently, [Njoroge \(2016\)](#), [Kikulwe et al. \(2014\)](#) and [Mugambi et al. \(2014\)](#) suggest that there is need for consumer protection on the digital financial system that can guarantee safety and security of the consumers. [Malady \(2016\)](#) contends that existence of strong consumer protection framework, which applies to digital financial services is critical in building the necessary trust and confidence that customers need to reduce the level of voluntary exclusion from the digital financial system arising from *ex post* data security concerns about losses through misdirected transactions. [Mazer and Rowan \(2016\)](#) further argue that competition and consumer protection policies can be mutually reinforcing, as they often share the same goal of increasing consumer welfare. For instance, price transparency regulation can help consumers to shop around, which in turn promotes increased market competition.

[CGAP \(2017\)](#) further argues that equipping users with the knowledge to empower them as financial consumers through financial literacy leads to wide access and use of mobile money services. Specifically, digitally financially literate consumers can understand what it means and what it takes to be financially resilient. This can help them to seek out mobile money financial products that can best serve their needs. Thus, as they are empowered to demand better products and to engage only with providers that demonstrate good market conduct, they become effective tools and partners for promoting financial inclusion and good governance in the Fintech ecosystem, especially in developing countries. Therefore, here we hypothesize that:

H2. Digital consumer protection significantly affect mobile money adoption and usage by MSMEs in northern Uganda.

Mobile money adoption and usage and financial inclusion

According to [ACCION \(2011\)](#), full financial inclusion entails four dimensions, which are vital in expanding access to and use of basic financial services, especially among the unbanked population in developing countries. These include: what is provided (full range of the financial services such as savings, credits loans, payments and insurance), how it is provided (with quality e.g. convenience, affordability, safety, dignity of treatment-consumer

protection), who receives (everyone who can use these financial services, including all the vulnerables such as the poor, disabled, refugees and women), who provides (a range of providers lead by main stream financial institutions). Thus, for full financial inclusion to be achieved, the provision of basic financial services, which are relevant and suitable to the unbanked population, should be without price or non-price barriers by both formal and non-formal financial institutions (World Bank, 2014).

Indeed, financial inclusion scholars, advocates and regulators have argued that full financial inclusion can be viewed through four lenses with increased levels of complexity of access, quality, usage and welfare (World Bank, 2014; Beck *et al.*, 2008; CGAP, 2010). However, formal financial institutions such as banks do not operate in rural areas where the unbanked population lives in developing countries leaving over 1.7 billion adults without access to and use of basic financial services.

Conversely, studies have indicated that mobile money adoption and usage has resulted in increased access to financial services for investments among microenterprises (World Bank, 2017; Mazer *et al.*, 2016). Indeed, mobile money adoption and usage has resulted into the provision of wide range of financial services with convenience, affordability, safety and dignity of treatment-consumer protection to a wider section of the society by MNOs. The recently released data from the World Bank Global Findex survey indicates that the level of financial inclusion increased dramatically between 2014 and 2017 because of the mobile money revolution. The data revealed that financial inclusion increased from 23 per cent in 2011 to 43 per cent in 2017 in Sub-Saharan Africa with a share of adults using mobile money account exceeding bank accounts with about 10 percent.

The International Finance Corporation (2018) further argues that the mobile-enabled digital cash transfer technology has been important in promoting access to financial services globally, especially for those working in the informal economy such as the MSMEs. Jussila (2015) observes that the gap in access to financial services, especially among the unbanked population engaged in microenterprises in developing countries has been closed by mobile network operators and financial service providers through the mobile money transfer services. The Rangarajan Committee (2008) further states that use of appropriate technology such as mobile money with low operational cost can promote outreach of financial services in remote areas. Accordingly, Kochhar (2009) contends that leveraging technology create channels beyond branch networks, which helps in extending banking services to the unbanked similar to those dispersed by branches.

Furthermore, the GSMA (2017) and Mbogo (2010) argue also that mobile money solution offers affordable, instant and reliable financial services such as savings, credit, payments and insurance opportunities in rural areas where banks have no established branches. Thus, use of fast growing mobile technology to design appropriate and affordable products and services, which helps the common people engaged in micro enterprises using mobile device without visiting a bank branch, can spur financial inclusion among MSMEs located in rural areas (World Bank, 2017). A study by Okello *et al.* (2018) found that mobile money adoption and usage led to financial inclusion of the poor in rural Uganda. Thus, here we hypothesize that:

- H3. Mobile money adoption and usage significantly affect financial inclusion of MSMEs in northern Uganda.

Methodology

Study design and approach

The appropriate design used for this study was cross-sectional design combined with quantitative approach to elicit responses from respondents selected to examine the mediating effect of consumer protection in the relationship between mobile money adoption

and usage and financial inclusion. Thus, data for this study were collected from 379 MSMEs selected from Gulu district, northern Uganda. This is because most MSMEs use mobile money services to carry out business transactions.

Study population and sample selection

The population for this study was drawn from MSMEs located in northern Uganda. Specifically, all the MSMEs used in this study were selected from Gulu district. The population for the study consisted of 36,640 MSMEs located in northern Uganda according to the [Uganda Bureau of Statistics \(2010/2011\)](#) Census of Business Establishment (COBE). Thus, from a population of 36,640 MSMEs, a total sample of 379 MSMEs were chosen for this study using [Krejcie and Morgan \(1970\)](#) guideline for sample size determination.

Sampling criteria and procedures

The sample for this study was randomly selected to provide responses to answer the hypotheses derived under this study. Random sampling was used to give all the MSMEs in the population equal chances to participate in the study. Thus, a total of 379 MSMEs were randomly picked from Gulu district, northern Uganda to participate in this study. Procedurally, the random selection involved initialling all the names of the MSMEs obtained from the Uganda Bureau of Statistics ([UBOS, 2010/2011](#)) database on pieces of papers and put into an empty box and the researcher and the research assistants randomly picked the papers with the initials until a total number of 379 MSMEs were selected for this study..

Instrumentation, measures of variables and data collection

The data for this study were collected from the respondents using a semi-structured questionnaire developed and modified in line with guidelines set by [Churchill and Iacobucci \(2004\)](#) for it to be reliable and valid for the study. The items in the questionnaire were generated from measures adopted from past scholarly work. The variables for the study were measured using different items anchored onto a five-point Likert scale with options ranging from 1 – strongly disagree to 5 – strongly agree to obtain the perception of the respondents about the study concepts.

The variable of mobile money adoption and usage was measured using items that were obtained and modified from [Okello et al. \(2018\)](#), [Suri and Jack \(2016\)](#) and [Aker et al. \(2013\)](#). Besides, digital consumer protection was measured using items obtained and modified from [CGAP \(2017\)](#), [Park and Mercado \(2018\)](#) and [Malady \(2016\)](#). Finally, the concept of financial inclusion was measured using items derived and modified from [Čihák et al. \(2012\)](#), [Ardic et al. \(2011\)](#), [Beck et al. \(2008\)](#). Indeed, 20 items were used to measure mobile money adoption and usage, while 16 items were adopted to measure the concept of consumer protection, and 19 other items were adopted and modified to measure financial inclusion. The semi-structured questionnaires were directly administered to the respondents by two research assistants who were trained how to score the questionnaire during the pilot stage of the study. Overall, a total of 396 questionnaires were administered to the selected MSMEs by the research assistants. The data for the study were collected within a period of one month.

Data management and assumptions of parametric data

The process of data management involves verification of the questionnaires from the field, data capturing, checking for errors, finding errors in the data file and correcting the existing errors in the data file as hinted by [Field \(2005\)](#), [Pallant \(2005\)](#) and [Hair et al. \(2010\)](#). At the data collection stage, some errors such as incorrect responses and careless scoring might have occurred; therefore, these errors must be corrected prior to the main data analysis.

Thus, raw data from the field were captured into the statistical package for social sciences and errors of missing values and outliers were established. Missing values analysis to ascertain the amount and pattern of missing data was performed by running frequencies for all the items in the questionnaire. The results indicated that some items had missing values. This could have occurred because the research assistants failed to rightly score the responses from the respondents. The data were missing-at-completely random (MCAR) and at less than 5 percent, which was recommended for replacement. The missing data in the data file were replaced using linear interpolation data replacement method as recommended by [Field \(2005\)](#). Similarly, test for outliers were performed on the data to identify values that were higher than the figures on the Likert scale. The box plot test results revealed that there were no outliers in the data. Therefore, this implied that the problem of reduced statistical power arising from missing values and the problem of biasness of the mean and inflated standard deviation were not present in data. Hence, the data were deemed fit for further statistical analysis as confirmed by the above tests.

Furthermore, assessment for assumptions of parametric data was also carried out on the data. Tests for assumptions of parametric data involving normality check and homogeneity of variance were performed on the data. The normality in the data was checked using the histogram, normal $p-p$ plot and skewness and kurtosis. Whereas, homogeneity of variance was established using the Levene's test statistics. Accordingly, [Field \(2005\)](#) argues that normality exist in the data when the histogram is bell-shaped and the normal $p-p$ plot has values falling along the straight line. Besides, the values of skewness and kurtosis should be between -2 and $+2$ in a normal distribution. More so, Field further states that the Levene's test statistics should be non-significant with $p > 0.5$ to show absence of multicollinearity. Thus, the results from the normality tests revealed that the histogram was bell-shaped, the normal pp -plot had all the values falling on straight line and the values for the skewness and kurtosis were between -2 and $+2$ as recommended by [Field \(2005\)](#). In addition, the results from the Levene's test also indicated that the values were non-significant with $p > 0.5$. Therefore, all the above tests confirmed that the data were good and tenable for further statistical analysis in partial least square (PLS).

Mediation test in partial least square (PLS)

There are several methods through which mediation effect can be established in social science research. Particularly, two common methods are used to establish mediation through the bootstrap approach. Both partial least square (PLS-SEM) and confirmatory factor analysis in analysis of moment structures (AMOS SEM) can be used to construct the measurement and structural models to establish the mediation effect. Under the PLS-SEM method, the explained variance of the endogenous latent variables is maximized by estimating partial model relationships in an iterative sequence of ordinary least squares regressions ([Hair et al., 2011](#)). Besides, in PLS-SEM the latent variable scores are estimated as exact linear combinations of their associated manifest variables, which are treated as error free substitutes for the manifest variables. Additionally, PLS-SEM presents less rigid distributional assumptions on the data as stated by [Hair et al. \(2014\)](#). Therefore, in establishing the mediation effect through PLS, two models are constructed. These are the measurement and the structural models.

Constructing measurement model. The measurement model is constructed to test for the composite reliability, convergent and discriminant validities of the manifest and the latent variables taking into consideration the outer loadings in the model. The composite reliability is measured using Cronbach's α coefficient. The rule of thumb is that the composite reliability should have values greater than 0.70 as recommended by [Nunnally \(1978\)](#), [Bagozzi and Yi \(1988\)](#) and [Cronbach \(1971\)](#). Additionally, based on the [Fornell and Larcker \(1981\)](#) criterion to test for discriminant validity, the diagonal correlation figures should be also higher than the inter-constructs correlations. Further, the average variance extracted

(AVE) is used to establish the convergent validity. Thus, measurement models were constructed to test the convergent and discriminant validities of the constructs under this study. The results are shown in [Tables I](#) and [II](#).

Constructing structural model. A structural equation model is constructed to show the inter-relationship between the manifest and latent variables of the main predictor, mediator and outcome variables in one complex model. The structural model is constructed to establish the mediation effect of the mediator variable between the predictor and the outcome variables in a single model. Besides, the predictive relevance and effect size are also determined after constructing the structural model ([Hair et al., 2016](#)). Consequently, a structural model through PLS-SEM bootstrap was constructed to establish the mediating effect of consumer protection in the relationship between mobile money adoption and usage and financial inclusion.

Research findings

Study response rate

This study intended to establish the mediating effect of digital consumer protection in the relationship between mobile money adoption and usage and financial inclusion of MSMEs. Thus, data were collected from 379 MSMEs located in Gulu district, northern Uganda. Accordingly, a total of 379 responses were collected, of which 364 were good and usable in this study. This accounted for 96 per cent response rate received in this study. This

Table I Convergent validity analysis					
<i>Variables and constructs</i>	<i>Loadings</i>	<i>Cronbach's α</i>	<i>CR</i>	<i>AVE</i>	<i>R²</i>
Financial inclusion		0.773	0.597	0.527	
FI11	0.600***				
FI17	0.724***				
FI18	0.760***				
Digital consumer protection		0.849	0.884	0.844	0.167
CP3	0.580***				
CP4	0.753***				
CP6	0.807***				
CP7	0.794***				
CP8	0.635***				
CP10	0.615***				
CP8	0.750***				
CP10	0.834***				
Mobile money		0.831	0.880	0.733	
MM12	0.864***				
MM13	0.721***				
MM14	0.783***				
MM2	0.760***				
MM4	0.725***				

Note: *** $p < 0.0001$

Table II Discriminant validity analysis			
<i>Variables</i>	<i>Dig consumer protection</i>	<i>Financial inclusion</i>	<i>Mobile money</i>
Digital consumer protection	0.769		
Financial inclusion	0.710	0.780	
Mobile money	0.408	0.428	0.772

response rate was good enough for statistical treatment necessary to test the hypotheses derived under this study (Field, 2005).

Study sample characteristics

According to the research findings, a comparative analysis indicated that more MSMEs were owned by women than men. The women ownership constituted 54 per cent of the MSMEs compared to 46 per cent ownership by men. This means that majority of the micro small and medium businesses, especially in the rural communities in developing countries are run by women entrepreneurs. This shows the contribution of women in economic development since MSMEs create jobs and contribute to the gross domestic products in most developing countries. Besides, the findings revealed up to 80 per cent mobile phone ownership among the MSMEs who were surveyed. This coincides with the fact that mobile phone ownership has grown in most parts of the world. This phenomenon has paved way for use of mobile phone for economic growth through access to market, inputs, information and financial services, especially in developing countries. Indeed, majority of the MSMEs' owners reported using their mobile phones to withdraw money from their mobile money accounts with 62 per cent attesting to use of their mobile phones on weekly basis to transact over the mobile money platform.

Mediation test in partial least square (PLS)

To establish the existence of mediation effect of consumer protection in the relationship between mobile money adoption and usage and financial inclusion, two models were constructed to test for the reliability, convergent and discriminant validity and the predictive relevance and effect size of the manifest and latent variables.

Measurement model

The results of the measurement models constructed revealed that all the variables had composite reliability Cronbach's α coefficient above the thresholds of 0.70 as recommended by Nunnally (1978), Bagozzi and Yi (1988) and Cronbach (1971). The constructs of mobile money adoption and usage, digital consumer protection and financial inclusion had composite reliabilities of 0.831, 0.849 and 0.773, respectively, as indicated in Table I. Furthermore, the diagonal correlation figures of the variables were higher than the inter-constructs correlations and the correlation figures for mobile money adoption and usage = 0.772, digital consumer protection = 0.769 and financial inclusion = 0.780. This is shown in Table II. This confirmed that the rule of thumb based on the Fornell and Larcker (1981) criterion to test for discriminant validity was not violated. Besides, the results of the AVE confirmed that the manifest and the latent variables achieved convergent validity with AVE values of 0.733, 0.844 and 0.527 for mobile money adoption and usage, digital consumer protection and financial inclusion, respectively, as indicated in Table I.

Structural model

To test for mediation, direct and indirect path coefficients were constructed from the predictor variable to the outcome variable and from the predictor variable to the outcome variable through the mediator variable. The PLS structural model was generated by selecting 5,000 samples in bootstrap in the Smart PLS menu to generate the output.

The results of the path coefficients together with the t and p -values in the structural model indicated that there was significant mediation effect of digital consumer protection in the relationship between mobile money adoption and usage and financial inclusion ($\beta = 0.262$, $t = 4.863$, $p < 0.0001$). This lends support to $H1$ of this study. Indeed, when the indirect path coefficient is constructed in the SEM model (Figures 1 and 2) through digital consumer

protection to financial inclusion, the effect of mobile money adoption and usage does not change but becomes non-significant. This implies that there is an existence of mediating effect (full mediation) of digital consumer protection in the relationship between mobile money adoption and usage and financial inclusion.

In addition, the results also showed that digital consumer protection has a significant effect ($\beta = 0.408$, $t = 5.798$, $p < 0.0001$) on mobile money adoption and usage. This corresponds to $H2$ of this study, which states that digital consumer protection significantly affect mobile money adoption and usage. Furthermore, the results also revealed that mobile money adoption and usage has a significant and positive effect ($\beta = 0.166$, $t = 1.418$, $p < 0.0001$) on financial inclusion. This coincides with $H3$ derived under this study.

According to [Hair et al. \(2016\)](#), after constructing the structural model to establish the mediating effect, the predictive relevancy of the model should be determined to establish its relevancy in decision-making. Thus, the predictive relevancy of the model is determined by the coefficient of determination (R^2) ([Field, 2005](#)). The rule of thumb is that the coefficient of determination (R^2) should be above zero for the model to be a relevant predictor. Therefore, the results from the study indicated that mobile money adoption and usage and digital consumer protection predicted 53 per cent of the variances in financial inclusion of MSMEs. Hence, it can be deduced that the above structural model combining mobile money adoption and usage and digital consumer protection is relevant in explaining financial inclusion in Uganda because the value of coefficient of determination (R^2), is above zero meaning that the rule of thumb was not violated.

Furthermore, the quality of the structural model was also examined using cross-validated redundancy through the blindfolding approach in Smart PLS. The rule of thumb is that the predictive relevancy must be above zero when some data points are removed to test how close the real result is from the assumed result. The results indicated that the cross-validated redundancy for financial inclusion was 0.225, while for digital consumer protection was 0.109. This corroborates with [Hair et al. \(2016\)](#) who argue that a predictive model with Q-value larger than zero has a predictive relevance.

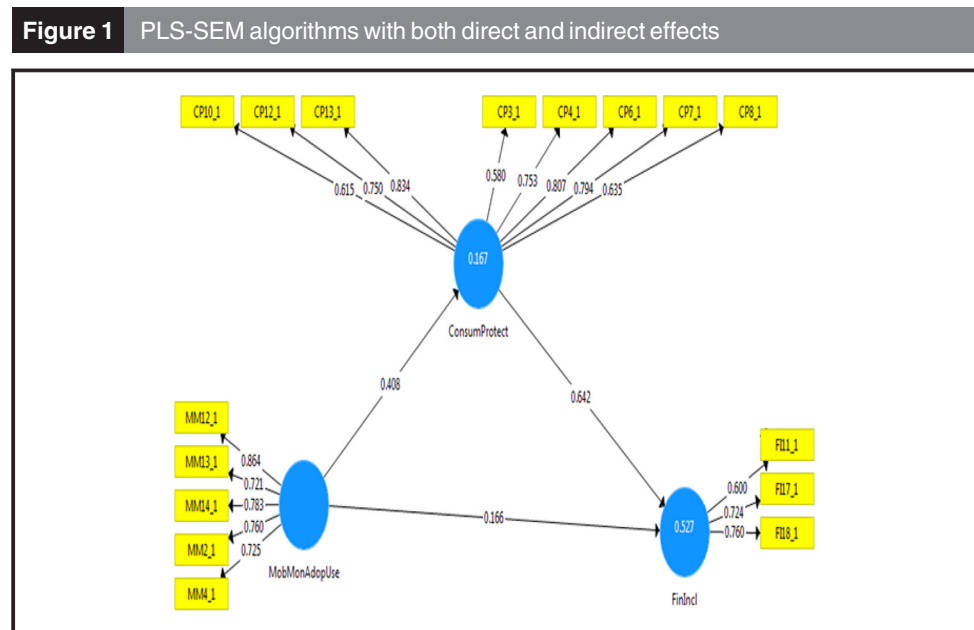
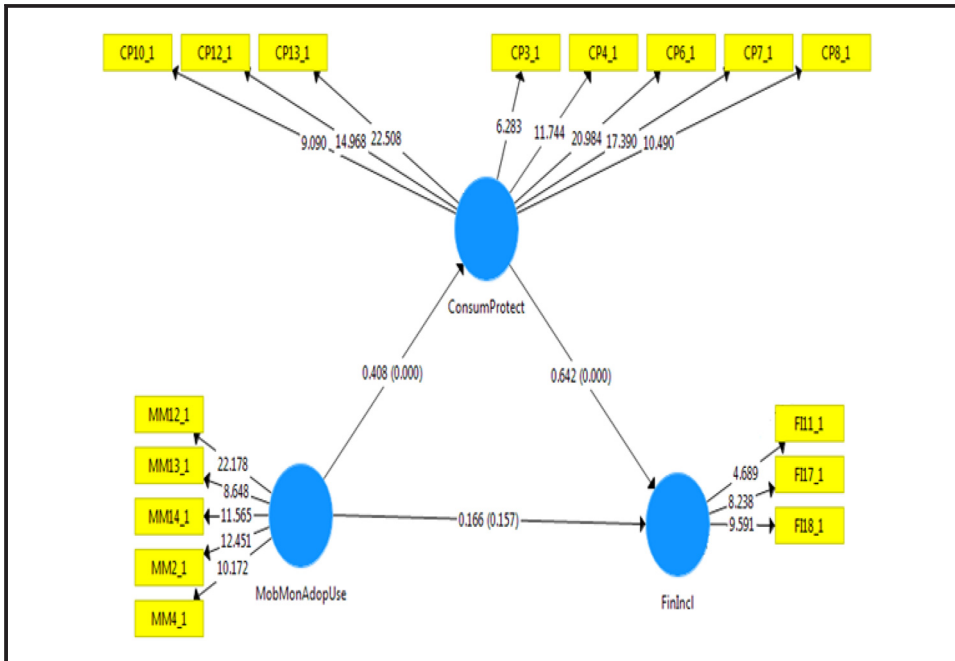


Figure 2 PLS-SEM algorithms with *t*- and *p*-values



Consequently, after establishing the predictive relevancy of the structural model and its quality, Hair *et al.* (2016) recommend that the effect size of the model should also be determined. According to Field (2005), the effect size is an objective and standardized measure of the magnitude of the observed effect. Therefore, Hair *et al.* (2014) argue that the effect size is determined by computing the change in R^2 by omitting one dependent variable in the model to assess the contribution of the omitted variable on the endogenous constructs. The results of the effect size are indicated in Table VII.

Discussion and conclusion

This study intended to establish the mediating effect of digital consumer protection in the relationship between mobile money adoption and usage and financial inclusion with data collected from MSMEs in Gulu district, northern Uganda. The following discussion focuses on the hypotheses that were generated in this study:

- H1.* Digital consumer protection significantly mediates the relationship between mobile money adoption and usage and financial inclusion of MSMEs in northern Uganda.

The findings from this study indicated that digital consumer protection has a significant mediating effect in the relationship between mobile money adoption and usage and financial inclusion ($\beta = 0.262$, $t = 4.863$, $p < 0.0001$). This finding is consistent with Mazer *et al.* (2016) who found that disclosing loan terms and conditions to customers borrowing through the KopaCash offered by the Jumo mobile money resulted into reduced defaults among the borrowers in Kenya. Indeed, the World Bank (2012a, 2012b, 2012c) argues that consumer protection on mobile money platform should ensure that consumers have enough information to make informed financial decisions with availability of access to recourse mechanisms to resolve disputes to prevent unfair practices by mobile money services' providers. Similarly, Prathap and Khaitan (2016) suggest that encouraging better choice, pricing and tailoring of offerings to customer circumstances including an obligation that lenders accurately assess individual consumers' needs and capacities and sell only those

Table III Factor loadings and cross-loadings

<i>Variables and constructs</i>	<i>Mobile money</i>	<i>Digital consumer protection</i>	<i>Financial inclusion</i>
<i>Financial inclusion</i>			
FI11	0.270	0.396	0.600***
FI17	0.228	0.558	0.724***
FI18	0.354	0.677	0.760***
<i>Digital consumer protection</i>			
CP3	0.065	0.580***	0.386
CP4	0.277	0.753***	0.519
CP6	0.331	0.807***	0.599
CP7	0.231	0.794***	0.557
CP8	0.317	0.635***	0.486
CP10	0.137	0.615***	0.436
CP8	0.385	0.750***	0.475
CP10	0.315	0.834***	0.613
<i>Mobile money</i>			
MM12	0.864***	0.333	0.328
MM13	0.721***	0.241	0.234
MM14	0.783***	0.305	0.359
MM2	0.760***	0.324	0.397
MM4	0.725***	0.354	0.305

Note: *** $p < 0.0001$

Table IV Factor loadings significant

<i>Variables and constructs</i>	<i>Loadings</i>	<i>SE</i>	<i>t-values</i>	<i>p-values</i>	<i>VIF</i>
<i>Financial inclusion</i>					
FI11	0.600***	0.128	4.689	0.000	1.302
FI17	0.724***	0.088	8.238	0.000	1.756
FI18	0.760***	0.079	9.591	0.000	1.719
<i>Digital consumer protection</i>					
CP3	0.580***	0.092	6.283	0.000	1.844
CP4	0.753***	0.064	11.744	0.000	2.186
CP6	0.807***	0.038	20.984	0.000	2.685
CP7	0.794***	0.046	17.390	0.000	2.578
CP8	0.635***	0.061	10.490	0.000	1.575
CP10	0.615***	0.068	9.090	0.000	2.030
CP8	0.750***	0.050	14.968	0.000	2.396
CP10	0.834***	0.037	22.508	0.000	2.223
<i>Mobile money</i>					
MM12	0.864***	0.083	8.648	0.000	2.322
MM13	0.721***	0.039	22.178	0.000	2.709
MM14	0.783***	0.068	11.565	0.000	2.072
MM2	0.760***	0.061	12.451	0.000	1.587
MM4	0.725***	0.071	10.172	0.000	1.748

Note: *** $p < 0.0001$

Table V Results of hypotheses testing

<i>Hypotheses path</i>	<i>Path coefficient</i>	<i>SE</i>	<i>t-value</i>	<i>p-values</i>	<i>95% LL</i>	<i>95% UL</i>	<i>Decision</i>
Dig con Prot ← MobMon	0.408	0.070	5.798	0.000***	0.245	0.529	Supported
FI ← MobMon	0.166	0.117	1.418	0.000***	-0.034	0.426	Supported
FI ← Dig cons Prot ← MobMon	0.262	0.054	4.863	0.000***	0.152	0.355	Mediated

Note: *** $p < 0.0001$

Table VI Predictive relevance of the model for mediation

<i>Exogenous variables</i>	R^2	<i>Cross-validated redundancy</i>
Financial inclusion	0.527	0.225
Digital consumer protection	0.167	0.109

Note: *** $p < 0.0001$

Table VII Effect size of exogenous variables on financial inclusion

<i>Exogenous variables</i>	R^2 included	R^2 excluded	R^2 included- R^2 excluded	$1 - R^2$ included	<i>Total effects</i>
Digital consumer protection	0.527	0.393	0.134	0.473	0.283
Mobile money	0.527	0.499	0.028	0.473	0.059

Note: *** $p < 0.0001$

products that are appropriate and meet the needs of particular consumers, are important in promoting financial inclusion through the mobile money services. The mobile money service providers should ensure that the products they sell are appropriate, adequately suited to the consumer needs and circumstances and delivered in a responsible fashion.

H2. Digital consumer protection significantly affect mobile money adoption and usage by MSMEs in northern Uganda.

Furthermore, the findings from the study also showed that digital consumer protection significantly affect mobile money adoption and usage ($\beta = 0.408$, $t = 5.798$, $p < 0.0001$). Indeed, scholars like Njoroge (2016), Kikulwe *et al.* (2014) and Mugambi *et al.* (2014) suggest that there is need for consumer protection on the digital financial system that can guarantee safety and security of the consumers. Malady (2016) contends that the existence of strong consumer protection frameworks, which apply to digital financial services, is critical in building the necessary trust and confidence that customers need to reduce the level of voluntary exclusion from the digital financial system arising from *ex post* data security concerns about losses through misdirected transactions. More so, CGAP (2017) also states that equipping users with the knowledge to empower them as financial consumers through financial literacy leads to wide access and use of mobile money services. Specifically, digitally financially literate consumers can understand what it means and what it takes to be financially resilient. This can help them to seek out mobile money financial products that can best serve their needs. Thus, as they are empowered to demand better products and to engage only with providers who demonstrate good market conduct, they become effective tools and partners for promoting financial inclusion and good governance in the Fintech ecosystem, especially in developing countries (Organization for Economic Corporation and Development, 2017).

H3. Mobile money adoption and usage significantly affect financial inclusion of MSMEs in northern Uganda.

Additionally, the findings from this study also revealed that mobile money adoption and usage significantly affect financial inclusion ($\beta = 0.166$, $t = 1.418$, $p < 0.0001$). The finding supports the recently released data from the World Bank FINDEX survey 2017, which indicates that the level of financial inclusion increased dramatically between 2014 and 2017 because of the mobile money revolution. Indeed, the International Finance Corporation (2018) argues that the mobile-enabled digital cash transfer technology has been central in promoting access to financial services globally, especially for those working in the informal economy such as the MSMEs. Jussila (2015) further contends that the gap in access to financial services, especially among the unbanked population engaged in microenterprises in developing countries, has been closed by MNOs and financial service providers through

the mobile money transfer services. Besides, the [GSMA \(2017\)](#) observes that the mobile money solution offers affordable, instant and reliable financial services such as savings, credit and insurance opportunities in rural areas where banks have no established branches. This has resulted in increased financial inclusion.

Conclusion

This study intended to establish the mediating effect of digital consumer protection in the relationship between mobile money adoption and usage and financial inclusion with data collected from MSMEs located in Gulu district, northern Uganda.

Thus, this study showed that digital consumer protection has a significant mediating effect in the relationship between mobile money adoption and usage and financial inclusion. This finding offers support to *H1* of this study. Ensuring that consumers have enough information to make informed financial decisions to prevent unfair practices by service providers, means that they should have access to recourse mechanisms to resolve disputes on the mobile money platform. Besides, the law towards consumer protection may exist, but these should be implemented with stringent punishment on the offenders.

Besides, this study revealed that digital consumer protection significantly affect mobile money adoption and usage. This is in line with the above *H2*. Indeed, an effective consumer protection that ensures good market conduct and upholding consumer protection are crucial in building trust in the use of mobile money services over the digital financial system. The protection of consumer data over the mobile money platform can built trust in its continuous adoption and usage.

Lastly, this study indicated that mobile money adoption and usage significantly affect financial inclusion. The use of fast-growing mobile tech to design appropriate and affordable products and services, which helps the common people engaged in micro enterprises using mobile device without visiting a bank branch can spur financial inclusion among MSMEs located in rural areas. This corroborates with *H3* above, which states that mobile money adoption and usage significantly affect financial inclusion.

Policy implications

The promoters of digital financial services, managers of MNOs and financial inclusion advocates should consider strengthening the existing consumer protection laws applicable to mobile money platform. A collaborative approach between the mobile network operators, financial institutions and regulators should tighten the existing laws against mobile money fraudsters and an efficient mechanism for recourse, compensation and remedy should be set up to benefit the victims of frauds and cybercrime on the Fintech ecosystem. Stringent laws and legal sentences should be placed on guilty mobile money fraudsters.

In addition, MNOs and financial service providers should also develop digital financial products that meet an increasingly nuanced demand from broader variety of users, especially for entrepreneurs who have been largely excluded from access to finance to sustain their growth trends. They should design financial products that suit the financial conditions of the MSMEs located in the rural areas. This will enable them to consume more of the digital financial products to grow their businesses.

Besides, MNOs and mobile money apps developers should develop mobile money applications that can be used through the ordinary mobile handsets with support fully encrypted and app-based transacting security features. This may help to offer greater security and protection to consumers from the mobile money fraudsters over different Fintech platforms. The consumers' PINs will be protected from hackers on the mobile money platform.

Furthermore, the digital regulator, managers of MNOs and financial inclusion advocates should also ensure that digital financial literacy is provided to users of mobile money to help them understand digital risks. This may provide the most critical defence against attack from cyber hackers who are increasingly using artificial intelligence and machine learning to launch ever more sophisticated and convincing phishing attacks on Fintech customers. The consumers will have better decisions and choices on what financial products to consume over the mobile money digital platform.

Finally, the MNOs and mobile money apps developers should upgrade the coding language and security systems applied over the mobile money platforms. The key technologies used such as the SMS and USSD have been cited to have known security weaknesses that could be exploited by cyber hackers to intercept transactions over the mobile money platform. Higher personalized sophisticated codes, which are user friendly to the digital products consumers should be developed to protect and attract more users of the mobile money services.

Study limitations

This study used partial least square (PLS-SEM) combined with bootstrap confidence intervals through a formative approach to establish the mediating effect of the mediator variable. Hence, it ignored the use of covariance-based SEM and the MedGraph programme. Furthermore, data were collected from samples located in the northern district of Gulu in Uganda with MSMEs as the main data source. This limits generalization of the study findings to other population who also use mobile money services.

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Appendix. Survey questionnaire

Dear respondents,

A study is being conducted on Mobile Money Adoption and Usage and Financial Inclusion: the role of Consumer Protection in Uganda. You have been selected to participate in this study. All the responses provided will be treated with utmost-faith and specifically for academic purpose and policy recommendations. Thank you for your participation in this study.

Section 1: Background information

Please kindly tick appropriately:

1. Gender 1) Male 2) Female _____
2. Age Group
1) 18 - 25 _____ 2) 26 - 33 _____ 3) 34 - 41 _____
4) 42- 49 _____ 5) 50+ _____
3. Education level
1) Primary school certificate _____ 2) Secondary school certificate _____ 3) Diploma _____
4) Bachelor Degree _____ 5) Post graduate degree _____
4. Type of business
1) Micro scale _____ 2) Small scale _____ 3) Medium scale _____ 4) Large scale _____
5. For how long have you been in the business?
1) 5 years or less _____ 2) 6 - 10 years _____ 3) 11 - 15 years _____
4) More than 15 years _____
6. Do you own a smart phone?
1) Yes _____ 2) No _____
7. In the last 7 days have you used mobile money for any transaction?
1) Yes _____ 2) No _____
8. What type of mobile money transaction do you use most?
1) Savings _____ 2) Payments _____ 3) Loans _____
4) Remittances _____ 5) Withdrawals _____ 6) others (please specify) _____

Section 2: Mobile money adoption and usage

Strongly agree (5), agree (4), not sure (3), disagree (2) strongly disagree (1). Score the right figure against each of the questions below:

- MM1 I save time when I use mobile money
- MM2 Mobile money helps me to perform my transactions in privacy
- MM3 Mobile money is helpful in the management of my transactions
- MM4 Access to mobile money speeds my transactions
- MM5 I have feeling of personal achievement for using mobile money
- MM6 The tasks of mobile money are within my limit
- MM7 I use mobile money because it is available 24 hours daily
- MM8 I carry little cash around because I use mobile money
- MM9 I prefer to use mobile money instead of banks
- MM10 I use mobile money for all my transactions
- MM11 I will continue using mobile money services as long as it exist
- MM12 I enjoy using mobile money services for my transactions
- MM13 The mobile money system meets my financial needs well
- MM14 The mobile money system meets my expectations
- MM15 I usually have no complaints about mobile money agent
- MM16 I'm always comfortable with the mobile money service network
- MM17 I'm always confident of the mobile money services
- MM18 I'm contented with the costs incurred in using mobile money
- MM19 I always use mobile money because of its reliability
- MM20 The registration process for mobile money services is easy

(continued)

Section 3: Digital Consumer Protection

Strongly agree (5), agree (4), not sure (3), disagree (2) strongly disagree (1). Score the right figure against each of the questions below:

- CP1 I feel secured to give my data over the mobile money platform
- CP2 I'm not worried to use mobile money because of its safety
- CP3 I believe that the mobile money agent will not expose my personal information to a third party
- CP4 I do not have fear that the mobile money agent will wrongly process my transactions
- CP5 I feel assured that my money will be refunded if it is sent to a wrong person
- CP6 I believe that the mobile money technology can stop intrusion into my account
- CP7 The existing laws are effective to protect mobile money users against fraud
- CP8 I believe that the associated risk with mobile money is minimal
- CP9 The mobile money service provider gives a lot of security instructions on how to protect my account from fraudsters
- CP10 My details are easily identified by the mobile money system if a fraudster uses it
- CP11 The telecom workers have no access to my PIN number
- CP12 The mobile money service providers have strong internal controls to protect all my transactions
- CP13 The mobile money service providers automatically blocks my PIN when tampered with
- CP14 The telecom companies always prevent SIM swaps
- CP15 I can easily stop a wrong mobile money transaction
- CP16 It is easy to get all the useful information about mobile money

Section 4: Financial inclusion

Strongly agree (5), agree (4), not sure (3), disagree (2) strongly disagree (1). Score the right figure against each of the questions below:

- FI1 There are many mobile money agents nearby my business
- FI2 The mobile money services are always readily available
- FI3 The mobile money transactions are affordable
- FI4 The mobile money agents always have enough floats/cash
- FI5 The mobile money telecom network is always reliable
- FI6 The numbers of documents required when registering for mobile money are few
- FI7 The mobile money service suits my needs
- FI8 The mobile money service is safe for me
- FI9 The mobile money service satisfies my needs
- FI10 The mobile money service is useful to me
- FI11 The level of service provided by mobile money agents is satisfactory
- FI12 The mobile money services are always at my convenience
- FI13 The mobile money services are user friendly
- FI14 The mobile money services are easy to access
- FI15 Mobile money transaction is less time consuming
- FI16 The terms and conditions on use of mobile money services are favorable to me
- FI17 Use of mobile money has improved on my business sales
- FI18 I have many customers because of using mobile money services
- FI19 Use of mobile money has improved on my business efficiency

Thank you

About the authors

George Okello Candiya Bongomin holds a PhD, MSc (Accounting and Finance) and bachelor's degree in Commerce (B.COM) from Makerere University Kampala, Uganda. He is a Research Fellow at Faculty of Graduate Studies and Research, Makerere University Business School (MUBS), Kampala Uganda and an international financial inclusion scholar. His research interests are in financial inclusion, digital financial services, development and business finance, rural finance (microfinance), behavioral finance, banking and finance practice, institutional economics, financial consumer protection and business psychology. George Okello Candiya Bongomin is the corresponding author and can be contacted at: abaikol3@yahoo.co.uk

Joseph Mpeera Ntayi, PhD, is a Professor of procurement and logistics management and a Dean, Faculty of Economics, Energy and Management Science, Makerere University Business School (MUBS), Kampala, Uganda. His teaching and research interests are in logistics, financial engineering, entrepreneurship, public procurement, managing contracts, business ethics, industrial marketing, purchasing and supply chain management. He is an entrepreneur and a public procurement and marketing consultant.

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