EFFECT OF SECURITY OF MOBILE PHONE BILL PAYMENT SYSTEM ON EFFICIENCY OF CUSTOMER BILL PAYMENT: A CASE OF SAFARICOM M-PESA CLIENTS IN KISII COUNTY, KENYA

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ABSTRACT

The main objective of this study was to examine the effect of security of mobile phone bill payment system on efficiency of customer bill payment, with a focus on Safaricom M-Pesa clients in Kisii County, Kenya. The study recognized the efficiency of bill payment with regard to the time and money saved, improvement in bill payment completion time, making several bill payments on any day, paying bills promptly, increasing the frequency of bill payment and having high bill payment completion rate.

Key Words: M-Pesa, paybill, security, Safaricom, customer

1. Introduction

M-Pesa has brought about a new mode of settling bills besides the traditional modes of payment such as cash, cheques, standing orders, demand drafts, money orders, banker's cheques, credit and debit cards. M-Pesa pay bill enables corporate organizations to receive funds from their customers or subscribers pay for goods and services rendered. It targets receiving payments conveniently and in a timely manner from customers. Upon signing up, an organization is issued with a business number to which payments can be made.

High level of efficiency on mobile banking is reflected from the cost effectiveness and a wide flow of information at no time and a reasonable cost (Sohel Ahmed et al., 2011). It has been perceived that he main driver for the rapid development is the new M-banking services that are less expensive and have a geographical footprint defined by the reach of mobile networks in contrast to services offered by traditional retail bank branches, that are out of reach for many people in rural areas from both an economic and geographical perspective (Bångens and Söderberg, 2008). A study in the United States of America (USA) revealed that whereas online bill pay and debit cards made it easy for bank customers to overdraw on their accounts, mobile banking gives consumers the ability to avoid accidently doing so (Shevlin et al., (2011). Pegueros (2012) noted that transactional services of mobile included account transfers, bill pay, person to person payments and remote deposit capture.

Although several mobile payment companies have tried mobile banking, some have registered success while others have ended up failing (Goyal et al., 2012). In Europe and North America with few exceptions such as Austria, Spain and Scandinavian countries the development of mobile payments has not been successful.

However, mobile payment services in Asia have been fairly successful especially in South Korea, Japan and other Asian countries. M-Pesa, an agent-assisted, mobile phone-based, person-to-person payment and money transfer system, was launched in Kenya on March 6, 2007. It allows users to store money on their mobile phones in an e-account and deposit or withdraw money in the form of hard currency at one of M-Pesa's numerous agent locations (Haas et al., 2010). As of January 2010, over 9 million people were subscribed to M-Pesa with almost 17,000 agents located throughout urban and medium-to-large market centers in the country as at January 2010 (Haas et al., 2010). M-Pesa improves individual outcomes by promoting banking and increasing transfers (Mbiti and Weil, 2011). This claim is strongly supported by Morawczynski and Pickens (2009) who found out that M-Pesa users often keep a balance on their M-Pesa accounts, thereby using the system as a rudimentary bank account despite the fact that the system does not provide interest. Besides, M-Pesa also allows customers to borrow money, check accounts and transfer money using their mobile phone (Munyange, 2012).

2. Statement of the Problem

The bill payment through M-Pesa was designed to enable users to offset their bills conveniently, fast and effectively at a cheaper transaction cost compared with the other modes of bills payment. However, despite all the attention M-Pesa has received, there is little quantitative evidence on its economic and social impacts (Mbiti & Weil, 2011). There is little research that has been done since its inception to determine its impact not only to the customers but also to the business owners in settling payments. Besides, there is no study (known to the researcher) that has been done to ascertain the Effect of Security of Mobile Phone Bill Payment System on efficiency of customer bill payment. It is for this reason that this study is undertaken so as to bridge the gap. The objective of this study was to examine the effect of security of mobile phone bill payment system on efficiency of customer bill payment, with a focus on Safaricom M-Pesa clients in Kisii County, Kenya.

3. Literature Review

The Federal Reserve survey defined mobile payments as "purchases, bill payments, charitable donations, payments to another person, or any other payments made using a mobile phone (FRB, 2013). From this definition, it can be noted that mobile payment involves sending of money from one party to another in an effort to offset a bill or make payment. Mobile banking has enabled millions of banked and unbanked people to deposit, withdraw and transfer money through mobile phones (Inam and Islam, 2012).

3.1 Mobile Banking in Kenya

This study is based on the Technology Adoption Model (TAM). The Technology Acceptance Model (TAM) is an information systems (System consisting of the network of all communication channels used within an organization) theory that models how users come to accept and use a technology, The model suggests that when users are presented with a new software package, a number of factors influence their decision about how and when they will use it, notably (Mazhar, 2006). From the model, when someone forms an intention to act, that they will be free to act without limitation. In practice constraints such as limited ability, time, environmental or organisational limits, and unconscious habits will limit the freedom to act (Wixom and Todd, 2005).

3.2 Security of Service and Efficiency in Bill Payment

Several researchers indicate that perceived security plays an important role when bank customers decide to adopt Internet banking services (Kaynak and Harcar, 2005; Liao and Wong, 2007; Altintas and Gürsakal,

2007; and Liao and Cheung, 2002). According to Polatoglu and Ekin, (2001), security comprises of three dimensions: reliability, safety, and privacy. Consumers' concerns about security, which arise from the use of an open public network, have been emphasized as being the most important factor inhibiting the adoption and use of internet banking (Sathye, 1999; Daniel, 1999; Hamlet and Strube, 2000; Tan and Teo, 2000; Cox and Dale, 2001, Polatoglu and Ekin, 2001, Black et al., 2002; Giglio, 2002). The key requirements for secure financial transactions in electronic environment include confidentiality, data integrity, authentication, and non-repudiation (Shon & Swatman, 1998). Other security factors important for consumer adoption are anonymity and privacy, which relate to use policies of customers' personal information and purchase records (Jayawardhena & Foley, 1998; Shon & Swatman, 1998). Mallat (2007) examined consumer adoption of a new electronic payment service, mobile payments. The empirical data for the explorative study was collected by establishing six focus group sessions. Some interviewees noted that in addition to complementing cash use, some plastic cards could be integrated in mobile devices to reduce current multitude of cards carried in a wallet, provided that the security of mobile payments would become good enough to prevent fraud and misuse. From the study, the perceived security risks include; unauthorized use, transaction errors, lack of transaction record and documentation, vague transactions, concerns on device and network reliability and concerns on privacy. Tavilla (2012) assessed the opportunities and challenges to broad acceptance of mobile payments in the United States and revealed that while convenience and increasing consumer comfort are obvious benefits, concerns about security and privacy risks around mobile payments remain major barriers to adoption. Consumers worry about the possibility of personal data being hacked or intercepted, mobile transactions being less secure than credit and debit card transactions, and possible fraudulent charges in the case of lost or stolen mobile phones. With proper security measures and specific regulatory guidance in place, mobile payments can be just as or even more secure than traditional payment methods. However, comprehensive education and marketing efforts are needed to reassure consumers of the safety of mobile payments. In the context of mobile banking, the perception of risk is even more important due to the threat of privacy and security concerns (Luarn & Lin 2005), fear of loss of PIN codes may also pose security threats (Kuisma et al. 2007). Some users also fear that hackers may access their bank accounts via stolen PIN codes (Poon 2008), while users may also have a fear of loss or theft of a mobile device with stored data (Coursaris et al. 2003). Therefore, perceived risk is more likely to negatively affect the mobile banking adoption.

Despite growing interest and increasing comfort levels on the part of consumers toward conducting financial transactions via mobile phone, security and privacy risks remain top concerns for mobile payments, and they continue to be a major obstacle to widespread adoption. Specific security issues identified vary by survey. Some consumer reservations stem from fear of payment account information being intercepted, threat of unauthorized parties accessing personally identifiable information, and receipt of unsolicited promotional material. Major impediments to consumer adoption of mobile banking and mobile payment technologies are concerns about security, in particular the possibility of hackers' remotely accessing consumers' phones and intercepting payment information as established by the Federal Reserve survey (2012) According to research from Synergistics, over half of mobile phone owners surveyed indicated identity theft as a top concern related to making mobile payments. Over 50 percent of the consumers surveyed in a First Data mobile payments study believed that making a payment via mobile phone was less secure than making a payment in person or with a credit or debit card. Regardless of the specific reason for the security concern, security issues must be addressed to achieve mass adoption of mobile payments. Deloitte (2013), investigated M-Banking and M-Payments in India and revealed that most people today still do not trust digital money and prefer to deal in cash since they have concerns about security, privacy, speed, as well as, transparency of usage charges when using digital money. It's suggested that adequate security and quality of service

standards need to be devised, defining robust standards of security and high quality of service including encryption protocols to be adhered to and uptime to be provided. This may be important as various private players from banks to telcos to other retail and technology players, enter this space, and attempt to reach a large segment of society. Assurance against money fraud is one of the key issues that need to be looked into by the regulators. Common standards to implement anti-money laundering, and ensure transparency and security to the customer may be an enabler to propel the use of mobile money.

Dahlberg and Mallat (2002) studied the managerial implications of consumer value perceptions on mobile payment service and concluded that superior security is created by user specific PIN codes, closed and operator controlled mobile networks with all network transactions registered, secured network traffic, and payment transaction certificates. This is compared to the claimed insecurities of Internet, and in the physical world to the need to carry cash. The M-Pesa application can use the security keys in the user's SIM card to encrypt messages end-to-end, from the user's handset to Safaricom's M-Pesa server. (Mas and Radcliffe, 2010). CBK's National Payments System (NPS) Division, Financial Sector Deepening (FSD) Kenya and the Consultative Group to Assist the Poor (CGAP) formed a partnership to undertake research into the experience of the developments in Kenya. When asked about the security of M-Pesa , the overwhelming majority of users (92%) said that the service is safe. This is mostly attributed to the fact that the PIN is secret, whereby access to the account is restricted to the user only. Having confidence in the operator (Safaricom) or its agent's plays only a subordinate role in creating customer trust. (Jack and Suri, 2010).

Virtually everyone reports that money sent through M-Pesa reached the recipient in full. About 4% of respondents say that they have ever sent money to the wrong person. A third of those who erroneously sent the money never got it back (at the time of the survey, this accounts for around 80,000 users). Those who were able to recover the money normally didn't have to wait for more than a few days for their transaction to be reversed by Safaricom. When someone registers for M-PESA, 95% of agents show them how to use it, and 74% suggest a way for them to choose a PIN (6% say they choose a PIN for the client, which is a clear violation of the security procedures). Clients themselves are not very prudent when it comes to data confidentiality: a substantial fraction tells agents their PINs when signing up. PIN numbers are already in widespread use in developing countries—for example, as a security feature on mobile phones—but not yet as e-signatures. Many developing countries have yet to adopt legislation enabling e-commerce. It is unlikely that individuals will accept the risk of accepting or making larger e-payments, or build new business cases on the receipt of e-payments, if their validity may be challenged. Establishing the legal validity of e-signatures is therefore a need for the m-payment/ m-banking market to grow to scale.

Interestingly, a consumer realizes that his mobile phone is missing sooner than his physical wallet. The average amount of time it takes a person to realize a lost wallet is approximately five or six hours, but it takes someone about 15 minutes to realize his phone is missing. It is possible that mobile payments can be more secure than traditional payment methods. For this to be the case, the phone must be set up correctly with risk mitigation tools having the ability to remotely wipe, delete, lock, and disable a lost or stolen mobile phone, with anti-virus and malware software, and with multiple layers of security to lock both the phone and access to the secure mobile wallet – and the consumer must use the mobile payments capabilities correctly.

As an added security measure, a consumer can request alerts for various types of account activities, such as suspicious purchases and transactions over preset limits. These tools require banks and other mobile payment providers to work collaboratively to help consumers understand that they also have responsibilities to protect their payment account credentials and physical devices, and to help consumers find and implement risk mitigation software and other tools. Consumers should be educated on what not to do, such as download untested, questionable, uncertified applications or share their mobile phones.

While security concerns remain a deterrent to mobile payments for many consumers, collaborative industry efforts to develop adequate education and effective security tools can assure them that mobile payments are a safe way to pay. Together, all these factors would help significantly augment mobile payments acceptance in the Further, it would be beneficial for banks and other mobile stakeholders to continue to partner in developing their mobile payment solutions

3.3 Measures of Efficiency

There are several studies that have highlighted on the efficiency of mobile money. Gu et al. (2009) found that self efficiency was the strongest antecedent of perceived ease-of-use, which directly and indirectly affected behavioral intention through perceived usefulness in M-money. Consumer Protection Service, Inc (CPSS, 2012) identified the following as measures of efficiency: reduced use of cash or cheques, lower processing costs, speeding-up of processing, overcoming infrastructural lags, inclusion of unbanked or under banked, government payments, fostering competition, improved convenience.

USAID (2011) noted that merchants opt to use M-Pesa for purchases, both for its convenience as well as its cheaper fee structure compared to most credit cards. It is affordable and it is much more effective in developing saving habits (Sohel et al., 2011; Al-Adwan et al., 2013). This is in support of Goyal et al., (2012)'s study which opined that m-payments should not be costlier than existing payment mechanisms to the extent possible.

Omwansa (2009) acknowledges the safety associated with mobile money payment by stating that a lost or stolen mobile phone does not mean loss of the money in the account, since one cannot easily know the owner's PIN. Hence, no one can access an M-Pesa account without a correct PIN. He further adds that in a country where majority of people have no bank accounts, M-Pesa provides both convenience and safety. This is supported by Bångens and Söderberg (2008) who documented that the main benefits to rural users are affordable, fast and secure transactions. People walk around with their virtual money knowing they can withdraw cash any time at a minimal fee. In a mobile environment, it is necessary to have perceived security and trust in the vendors and the payment system (Mallat, 2007, cited in Mbogo, 2010). The value proposition for use of M-Pesa by organizations focuses on a number of benefits, including reduction of cash "leakage" and corruption, less paperwork; better transparency and accountability via the electronic records (USAID, 2011). This is due to the fact that one does not need to fill forms to have his transfer effected. Besides, the recipient also doesn't need to fill any form(s) before receiving the money, a characteristic so common in commercial banks.

The most important factor that attracts customers to use e-payment is its convenience (Al-Adwan et al., 2013). M-Pesa, just as any other form of bill payment, can be used over a vast geographical area. The customer does not have to visit the bank ATM or a branch to avail of the bank's services. Jack and Suri (2010) note that by transfers across large distances trivially cheap, M-Pesa improves the investment in, and allocation of, human capital as well as physical investment. Households may be more likely to send members to high-paying jobs in distant locations (e.g., the capital), either on a permanent or temporary basis, and to invest in skills that are likely to earn a return in such places but not necessarily at home. Customers consider M-Pesa a cheaper, faster and safer option for sending money, and one that is considerably more accessible than other options out there, such as bus, taxi, PostaPay or bank branches (Jack and Suri, 2011). Mobile banking is available anytime, anywhere throughout the country (Sohel Ahmed et al., 2011). Goyal et al. (2012) also add on this by stating the speed at which m-payments are executed must be acceptable to customers and merchants. This all reflect the convenience of M-Pesa payment.

4. Research Design

The study adopted a quantitative research design. The design was analytic in approach and sought to prove or disprove formulated hypotheses using quantitative and inferential statistics. This design enabled the researcher to manipulate the independent variables while looking out for any causative effects on the dependent variable. The study was conducted in Kisii County, Kenya. The target population for this study was Safaricom subscribers who use the M-Pesa platform to pay their bills, and M-Pesa vendors within Kisii County. The study realized that the exact study population could not be ascertained due to the ever changing customer needs and was therefore estimated to total over 10,000 for analysis purposes. A sample of 272 respondents was used in the study. Primary data was collected using a questionnaire that was administered to the selected sample. Secondary data involved a review of published material from other studies and experts, to relate the studies to the current study. It formed the basis for formulating a statement of the problem, objectives and hypotheses.

4.1 Response Rate

The current study sought to establish the effects of M-pesa Pay Bill system on efficiency of Safaricom customers in paying bills. In line with data analysis process, data were first collected and cleaned. Data were then explored using descriptive statistics before finally analyzing for existing relationship among variables. Out of the 272 questionnaires that were administered to the purposively sampled customers, 235 questionnaires were returned for which 5 were further discarded for either lack of response or being improperly filled out. The researcher ended up with 230 usable questionnaires which represented a response rate of 84.2%. This was considered sufficient from which to draw conclusions upon.

4.1 Gender Distribution of Respondents

The study therefore sought to analyze the gender composition of the sample. The results showed that majority of respondents (62.1%) of the total customers were male than female who represented only 37.9% of the total customers included in the survey. This could probably reveal that male customers use the M-Pesa bill payment system more in making their payments.

4.2 Distribution of Respondents on Basis Educational Level

Respondents' level of education was analyzed using four indicator categories. Results of the analysis indicate that most of the respondents (34.4%) appeared to have attained certificate or diploma level of education. However, they were closely followed by those who had completed secondary school (32.6%). The least number of respondents were those who had an education level of up to post graduate (7.9%). This implies that the decision among the respondents to use M-Pesa in payment of bills may not have been influenced by level of education.

4.3 Distribution of Respondent's age

The results showed that a majority of the respondents (55.1%) belonged in the age bracket 31-50 years. This implies that most of active users of the M-Pesa platform in the study area are those between 30 years and 50 years. This could possibly be because this is the most active age bracket and which includes most employed respondents.

4.4 Respondents Employment Profile

Respondents were asked to indicate whether they were formally or informally employed. Results indicated that most of the respondents were formally employed (57.3%). However, a large proportion (42.7%) was

engaged in informal employment. This implies that the sample was relevant since employment would mean need to pay for certain statutory payments which could require the M-Pesa platform.

4.5 Perceived Levels of Security of the M-Pesa Pay Bill system

Respondents were asked the extent to which they agreed/disagreed with items reflecting security of the system. Seven items were used to measure respondent's perceptions of the systems security. Results presented in Table 1 reveal that Safaricom customers in the study area have confidence in the security of the M-Pesa bill payment system. All the response approximated the agreement score of 4.00 and had small standard deviations which showed small variations from the variable mean hence consistency in responses. More particularly, respondents tended to agree that they have never been afraid of losing money while the system while using system (M=4.12, SD=0.571), that their bill payment is always credited to their account (M=3.96, SD=0.677); that the system performs well and always processes payments correctly (M=3.90, SD=0.693), among others.

Table 1: Perceived Levels of Security of M-Pesa Bill Payment System Among Safari com Customers in Kisii County

	Mean	Std. Deviation
I have never been afraid of losing my money while using the M-pesa paybill	4.12	.571
My bill payment is always credited to my account	3.96	.677
I am able to safely pay my bills without fear of losing my money	3.93	.668
Paying bills via M-pesa is safer than carrying cash money	3.93	.755
M-pesa pay bill system performs well and always processes payments correctly	3.90	.693
I have never lost money from my account as a result of using the M-pesa pay bill system	3.86	.634
My pin number is very secure	3.79	.532
My unique pin number secures my money	3.76	.676

4.6 Efficiency of Safaricom customers in Payment of Bills

Efficiency of Safaricom customers in payment of bills was conceptualized as the dependent variable in the present study. Analysis of the prevailing level of efficiency in payment of bills in the study area was assessed from two perspectives. First the study sought to identify bills that customers pay using the paybill system. Secondly, the study examined the levels of efficiency using identified indicators of efficiency.

4.6.1 Bills paid using the M-Pesa Pay Bill System

Bills paid using M-Pesa bill payment system were assessed and ranked according to the mean response scores of the respondents. Results of this assessment are shown in Table 2. The results show that seven major services are paid for using M-Pesa bill payment system among Safaricom customers in the County. Ranked first among these services is payment of goods purchased (M=4.21, SD=0.651); this is followed by payment of electricity bills (M=4.12, SD = 0.587); payment of water bills (M=4.12, SD = 0.637); payment of NSSF contributions (M=4.00, SD=0.431); payment of other services (M=3.99, SD=0.404); payment of insurance premiums (M=3.93,SD=0.451); payment of NHIF contributions (M=3.79, SD = 0.663); and payment of school fees (M=3.72, SD = 0.560) in that order. These results imply that the M-Pesa bill

payment system has been embraced by Safaricom customers in the County. Key services whose bills are paid through this system are goods purchased mainly from super markets and payment of electricity and water bills.

Table 2: Bills Paid Using M-Pesa Bill Payment System Ranked by Order of Preference

Rank	Bills paid	Mean	Std. Deviation
1	payment of goods purchased	4.21	.651
2	payment of electricity bills	4.12	.587
3	payment of water bills	4.12	.637
4	payment of NSSF contributions	4.00	.431
5	payment of other services	3.99	.404
6	Payment of insurance premiums	3.93	.451
7	payment of NHIF contributions	3.79	.663
8	payment of school fees	3.72	.560

4.6.2 Respondents Perceived Efficiency in Payments of Bills.

It was necessary to find out how customers perceive efficiency in payment of bills using the M-Pesa bill payment system. This was necessary since the study conceptualized direct relationships between these independent variables and the efficiency of customers in paying bills. Eight indicators, among them, non disconnection, timeliness, payment completion rate, frequency of payment, potential returns, and payment completion time were used to measure customer efficiency in payment of bills. Respondents were asked to indicate the extent to which they have complied with selected aspects of efficiency in payment of bills. Responses were elicited on a 5-point scale ranging from 1-very low to 5–very high. Results of this assessment are displayed in Table 3. Results reveal that safaricom customers in Kisii County perceive themselves highly with regards with efficiency in paying their bills. They reported high extents in among others, maximizing potential returns in terms of time and money saved (M=4.37, SD = 0.518)' improvement in bill payment completion time (M=4.30, SD = 0.505); making several bill payments on any day (M= 4.23, SD = 0.533); paying bills promptly (M=4.16, SD = 0.393); increasing the frequency of bill payment (M=4.16, SD = 0.385); and having high bill payment completion rate (M=4.04, SD = 0.403). These results clearly portray that Safaricom customers in the study area have benefited in terms of bill payment as a result of the M-Pesa bill payment system. They have seen reductions in service disconnections as a result of non-payment of bills.

Table 3: Safari com Customers Perceived Levels of Efficiency in Payment of Bills

	Mean	Std. Deviation
I have maximized potential returns in terms of time and money saved	4.37	.518
My bill payment completion time has improved	4.30	.505
I make several payments of my bills on any day	4.23	.533
I have always paid my bills promptly	4.16	.393
My frequency of bill payment has gone up	4.16	.385
I have never forfeited any security deposits held for non payment	4.10	.473
I have a high bill payment completion rate	4.04	.403
I do not suffer any service disconnection due to non payment	3.79	.663

5. Summary of Findings

The study realized that respondents are not afraid of losing money while using system, that their bill payment is always credited to their account; that the system performs well and always processes payments correctly. The study also revealed that, the main services paid for using M-Pesa bill payment system include payment of goods purchased, electricity bills, water bills, payment of NSSF contributions, insurance premiums, NHIF contributions and payment of school fees. The respondents recognized the efficiency of bill payment with regard to the time and money saved, improvement in bill payment completion time, making several bill payments on any day, paying bills promptly, increasing the frequency of bill payment and having high bill payment completion rate.

The study reveals that M-Pesa bill payment system has the potential to boost customers' efficiency in paying their bills. Also, perceived security of the M-Pesa system with its unique pin codes acts as an incentive to use the system and the convenience of the system allows payment of bills thus playing a great role in the determination of bill payment efficiency. In view of the conclusion made above, the study recommended that security of the service is made paramount so as to lock out con men that tend to target illiterate and old customers. From the findings of this study, it was concluded that perceived security of the M-Pesa system with its unique pin codes acts as an incentive to use the system and the convenience of the system allows payment of bills thus playing a great role in the determination of bill payment efficiency.

6. Recommendations

In view of the conclusion made above, the study concluded that security of the service is made paramount so as to lock out con men that tend to target illiterate and old customers. The study also recommended that, since the current study did not put into consideration the several extraneous variables that could contribute to efficiency of customers in payment of bills, a similar study should be conducted to check for the moderating influence of customers socio-economic characteristics on the relationship between the bill payment system and efficiency in payment of bills.

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