

EXAMINING THE CONTRIBUTION AND IMPLICATIONS OF MOBILE WATER PAYMENTS FOR WATER BILL COLLECTION AT MWAUWASA, TANZANIA

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ABSTRACT

This paper aims to examine the contribution and implications of mobile water payments (MWPs) for water bill collection at MWAUWASA. The study focused in testing three variables namely; MWPs adoption rate by customers, benefits of MWPs for water services and challenges facing MWPs for water services. Both qualitative and quantitative analytical techniques were used to collect data from a purposively selected sample of 75 MWAUWASA officials and 100 water bill payers. The trend of M-Pesa adoption has been increasing though at a lower pace and revenue collection efficiency has increased too, but still over 60% of customers are paying through cash, the challenges that hinders them being inefficiency of the M-Pesa payment system. The study recommends that MWAUWASA should focus on delivering quality M-Pesa system that meets the client's needs and more sensitization to customers should be done about usage of M-Pesa and adoption of a cashless system is advised.

Key words: M-Payments, M-Pesa, Water Utility bills, MWAUWASA, Mobile Water Payments, TAM model, UTAUT Model.

1.0 INTRODUCTION

1.1 Background

Mobile payment is receiving great attention globally, from consumers to merchants, as an alternative to using cash, cheque, or credit cards (Oliveira, Thomas, Baptista & Campos, 2016). Mobile technologies have not only become widespread rapidly, but they currently also have the advantage of reaching customers on behalf of firms. Mobile technologies have lots of advantages against other technologies, such as interacting with anybody anywhere, being in use individualistically, customized information and services, and getting quick answers from users (Dastan & Gürler, 2016). Dastan & Gürler (2016) also stressed that Mobile devices are developing over time to mobile wallets and consumers can make their payment through these devices. In Tanzania, mobile payment has a significant adoption as a convenient way of paying for such services as utilities and airtime top up. There were four major mobile payment networks in Tanzania: Vodacom with M-Pesa (42% market share), Tigo Pesa (31%), Airtel with Airtel Money (24%), and Zantel with Ezy Pesa (3%) (Castri & Gidvani, 2014). According to Krolikowski, Fu & Hope (2013) they stated that Vodacom Tanzania and Airtel have been offering mobile payment services for payment of water bills and Dar es Salaam Water and Sewerage Corporation (DAWASCO) was the first to offer mobile-enabled payments for water services. Currently, this option is available in other regions including Mwanza. The mandate for provision of water and sewerage services in Mwanza City, the second largest city in Tanzania lies with the Mwanza Urban Water and Sewerage Authority (MWAUWASA), an autonomous public authority that operates water and sewerage services for over 770,000 people in Mwanza City and other designated areas including Kisesa Township (Ndaw & Welsien, 2017). MWAUWASA also envisages mitigating the current high Non-Revenue Water to improve sales and revenue collections. Extending water debt payment points to MWAUWASA's zone offices in line with introduction of water payment through Vodacom M-PESA, and CRDB Bank Ltd systems (MWAUWASA, 2011).

1.2 Statement of the Problem

Literature reveals that Water Service Providers (WSPs) in Tanzania and some other African countries have introduced the mobile bill payment option to reduce payment transaction costs, improve payment processing, improve billing accuracy etc. (Krolikowski, FU & Hope, 2013; Foster *et al.*, 2012). However, there has been much speculation regarding the contribution of mobile payment systems on customer payment behaviours and water utility performance and efficiency (Foster *et al.*, 2012). The problem addressed in this study focuses on the current contribution of mobile water payments on water services by MWAUWASA.

The study will benefit different stakeholders at various levels such as MWAUWASA clients, MWAUWASA institution, researchers and academicians interested in this line of research. In this context, the findings of this study will provide a

base for MWAUWASA to determine strategies to enforce the use of MWPs to its clients. Moreover, the study will provide useful literature for other academicians interested in this line of research. Examining the contribution and implication of Mobile Water Payments to clients and water utility industry is an issue that has yet to be addressed fully. It is with this contention that researchers believe that Mobile water payments is a topic that will be of interest to many researchers.

The general objective of this study was to examine the role of MWPs on water services and the specific objectives were to:

- a) Evaluate the MWPs adoption rate among MWAUWASA customers
- b) Examine the benefits of MWPs for water services
- c) Examining the challenges facing MWPs for water services

1.3 Justification

A few studies have explored the impacts and implications of MWPs (e.g. Hope, Foster, Krolkowski & Cohen, 2011; Foster, Hope, Thomas, Cohen, Krolkowski, & Nyaga, 2012). Among the key findings of the study conducted by Foster *et al.* (2012) revealed low mobile water payments adoption rates among water bill payers in Kenya, Uganda, Tanzania and Zambia. Key barriers to adoption included delayed reconciliation of billing systems, limited customer awareness, lack of physical proof of payments, high transaction tariffs and convenience of alternative pay points. The studies further revealed that MWPs reduce opportunities for petty corruption, improve revenue collection per customers and enhance the quality of data generated by the billing payment process (Foster *et al.*, 2012; Krolkowski, FU & Hope, 2013). At least five years have passed since such studies were conducted. In the interim various changes have obviously taken place including diffusion of information to create customer awareness, increased use of mobile phones etc. It is therefore imperative to conduct a study to examine the current contribution of MWPs.

2.0 LITERATURE REVIEW

2.1 Definition of key terms

2.1.1 M-Payment

Mobile payment refers to a form of payment service operated under regulation and performed from or via a mobile device (Castri & Gidvani, 2014)

2.1.2 Mobile money

Is an electronic payment system that enables money transfers to and from an electronic account that can be accessed via an ordinary mobile phone (Foster *et al.*, 2012)

2.1.3 M-Pesa

M-PESA- the M is for mobile phone and PESA is the Swahili word for money- is a platform for making small value electronic payments (Cull, 2010)

2.2 Theoretical literature review

2.2.1 UTAT Model

This study used the Unified Theory of Acceptance and Use of Technology (UTAUT) to explain the factors influencing the adoption of M-Payments. The theory was formulated by Venkatesh *et al.*, (2003) to explain user intentions to use an information system and subsequent usage behavior. The theory holds that there are four key constructs, performance expectancy, effort expectancy, social influence and facilitating conditions. The latter key constructs is a direct determinant of the user behavior and the other three constructs are direct determinants of usage intention and behavior. The constructs were defined as; Performance expectancy “the degree to which the user expects that using the system will help him or her attain gains in job performance”, Effort expectancy “the degree of ease associated with the use of the system”, Social influence “the degree to which an individual perceives that important others (family and friends) believes should use the new system. UTAUT has been used and tested over the years in various studies in analyzing the adoption of Mobile money adoption by users (Ahmad *et al.*, 2014; Tossy 2014; Kristensen 2016). The construct of performance expectancy, social influence, effort expectancy and facilitating conditions guided this study as a measure of efficiency in mobile water bill collections.

2.2.2 Technological Acceptance Model (TAM)

TAM is one of the most frequently used models formulated as an information systems theory that models how users come to accept and use a technology. In looking at the acceptance of technology (Davis, Bagozzi, & Warshaw, 1989) choose the two attitudes they labeled most important for accepting a technology namely Perceived Usefulness (PU) and Perceived Ease of Use (PEOU).

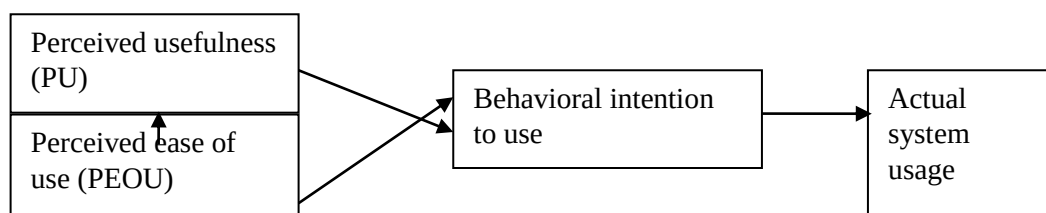


Fig 1 –Technology Acceptance Model (TAM) Davis et al. (1989) Venkatesh et al. (2003).

Perceived Usefulness denotes the degree to which consumers believe that using a system would help them to perform jobs or duties better (Davis, 1989). Linking this to the domain of mobile payment service, consumers develop favorable attitude and intention towards such payment method because it has relative advantage compared to other methods such as cash, and card payments (Arvidsson, 2014). Various studies based on TAM confirm the positive relationship between perceived usefulness and intentions to use mobile payment services (Nysveen, Pedersen, & Thorbjørnsen, 2005a; Shin, 2009; Venkatesh & Davis, 2000). Davis (1989) suggests that, despite performance benefits (i.e. perceived usefulness), consumers may not adopt use mobile services which require a great deal of effort in using. Hence, he posits that perceived ease of use, indicating the effort or difficulty consumers derived through the use of a particular mobile service, exerts direct influence on intention to use mobile service. As such, if consumers perceive that mobile payment services are easy to use, they are likely to use such services. Empirical evidence has converged into the prominent role of perceived ease of use in determining consumers' intentions to use mobile payment services (Cheong & Park, 2004; Kim, Mirusmonov, & Lee, 2010; Nysveen et al., 2005b). In an effort to turn around their ailing financial positions, many WSPs are teaming up with mobile networks operators (MNOs) to enable customers to pay their water bills using mobile money (Foster *et al.*, 2012)

2.3 Empirical literature review

The study on key drivers for merchants' adoption of mobile payments are related to the means to increase sales, means to reduce payment processing costs, and to specific benefits provided by the mobile technology (Mallat & Tuunainen, 2008). Tossy (2014) analyzed relationship between M-Payments and the six factors facilitating conditions, performance expectancy, effort expectancy, social influence, trust and perceived risk, four of them tested positive except the two factors (facilitating conditions and effort expectancy) were found not significantly affecting the individual intention to use M-Payments. Furthermore, M-payment is beneficial to both, service providers and customers (Economides & Jeziorski, 2016) in a way that, using the demand estimates, the willingness to pay to avoid walking with cash an extra kilometer (short distance self-transportation) and to avoid storing money at home (money storage) for an extra day are 1.25% and 0.8% of an average transaction, respectively, which demonstrates that mobile money ameliorates significant amounts of crime-related risk. According to Zhou (2013), system quality, information quality and service quality affect continuance intention through trust, flow and satisfaction. In addition, trust affects flow, which in turn affects satisfaction. The results imply that service providers need to deliver quality system, information and services in order to facilitate users' post-adoption usage of mobile payment. Kristensen (2016) suggested that service providers should concentrate on usefulness, compatibility social influence and trust to improve adoption of mobile payment at point of sale.

3.0 RESEARCH METHODOLOGY

Kumar (2011) defines research design as a plan, structure and strategy of investigating so conceived as to obtain answers to research questions or problems. The study embraced descriptive research design. Descriptive design is used when collecting information about people's attitudes, opinions, habits and other possible behavior (Orotho and Kombo, 2002). The study focused at examining the contribution and implication of Mobile water payments for water bill collection. It is with that connotation descriptive design was reflected as the most appropriate for this particular study.

Both qualitative and quantitative methods of data collection were embraced to describe the study. Mwanza city was selected as a focus of this study through MWAUWASA because Mobile water Payments system is relatively new and there is still lack of empirical literature about the effectiveness of MWPs focusing on MWAUWASA. The population comprised of key MWAUWASA staff and water bill payers in Mwanza city around Nyamagana municipality. Based on the nature of the study, the population chosen comprised of the respondents who could provide reliable information. The sample was sourced through purposive and random sampling techniques. 75 key informants from different departments at MWAUWASA were selected randomly. From the client side, the researcher randomly sourced 100 water bill payers purposively from the College of Business Education. Secondary data was sourced through documentary review whereas interviews to MWAUWASA staff and questionnaires were used as a means of collecting primary data. The selection of the tools was guided by the nature of the study, the available time and objectives of the study. Verified data from the

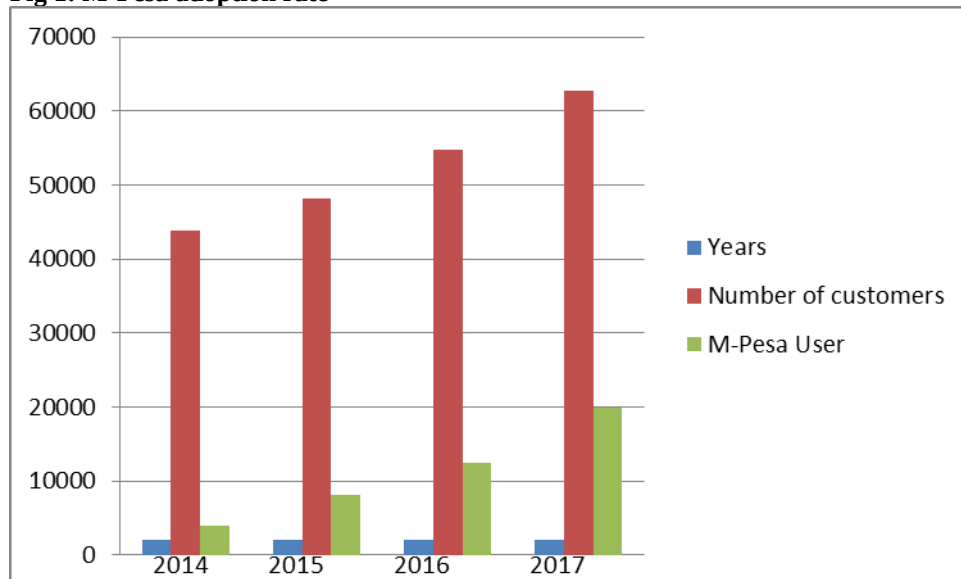
questionnaires was analyzed through descriptive statistics with the aid of the statistical package for social sciences software (SPSS). Results were presented using tables, frequencies and percentages. Mobile water Payments adoption rate by MWAUWASA customers was analyzed from both customers and MWAUWASA's perspective.

4.0 FINDINGS, ANALYSIS AND DISCUSSION

4.1 Objective 1: Mobile Water Payments adoption rate by MWAUWASA customers

The results (Fig 1) indicate that the rate of adoption of M-Pesa usage by MWAUWASA customer has increased from 9.12% (2014) to 31.92% by April, 2017 as evidenced by the monthly billing reports for the past four years consecutively. Since its inception in 2012 M-Pesa means of payment has been embraced by MWAUWASA clients, though the usage rate is still insignificant because up to the year 2017, 68.08% of MWAUWASA clients are still not paying their bills via M-Pesa. Such that the concern of queue is still not fully addressed.

Fig 1: M-Pesa adoption rate



Source: MWAUWASA billing report, 2017

Table 1 reveals that, 42% of MWAUWASA clients were using M-Pesa. These results support the data from MWAUWASA monthly billing report of April, 2017 which reported that 31.9% of the customers used M-Pesa to pay their bills. The variation could be due to the sample of clients used, but in general the entire M-Pesa adoption rate is still low.

Table 1: Customer's perspective

Payment Method	Response
Cash	33
M-Pesa	42
Both M-Pesa and Cash/Bank	25
Total	100

4.2 Objective 2: Benefits of MWPs for water services

The study also examined the benefits achieved by both MWAUWASA and customers in the usage of M-Pesa as one of the means of water bill payment. Mr. Manyama a Commercial Manager at MWAUWASA revealed to the researchers that, *"there were a number of benefits derived from M-Pesa system usage in Water bill payment"*. The major benefit realized was an increase in revenue collection efficiency from an average of 85% before adoption of M-Pesa up to an average of 98% by April, 2017 as quoted from the Monthly billing report. These findings align with the study conducted in East Africa by (Foster *et al.* 2012). The studies further revealed that MWPs reduce opportunities for petty corruption, improve revenue collection per customers and enhance the quality of data generated by the billing payment process (Krolikowski, 2013). The latter benefit has a direct link in achievement of other benefits such as; reduction in operation, costs and efficiency in service provision to clients as depicted in Table 2 below

Table 2: Benefits of M-Pesa at MWAUWASA, MWAUWASA staff' view

Operation costs	Supporting response
Reduced need of task force	85.70%
Reduces use of paper work	90%
Replaced recruitment of more cashier	48.60%
Reduced field work and transport cost	82.90%
Reduced overtime hours	75.90%
Efficiency	
Reduced Customers complains	65.70%
Timely revenue collections	41.40%
Reduced queuing	77.10%
Easy track of transactions	82.90%
Reduced delay of bill payments	82.90%

The benefits constructs significant to the study to both MWAUWASA staff and the clients were reduction in operation costs as well as efficiency in service provision. The results found in table 3 below, were collected from MWAUWASA clients who were M-Pesa users in water bill payments. M-Pesa users agree that M-Pesa system is beneficial to them. The major benefits supported by M-Pesa users were, reduction of queue at 98.6%, reduction of petty corruption at 91.6%, system being user friendly (convenience) at 95.8% and transaction cost being free at 66.2%. Both data from MWAUWASA and clients are relevant as evidenced by (Foster *et al*, 2012)

Table 3: Benefits of M-Pesa, MWAUWASA Clients' view

Benefits of M-Pesa	Response
Reduced queue	98.60%
Reduced Petty corruption	91.60%
Transaction cost free	66.20%
User friendly	95.80%

4.3 Objective 3: Challenges facing MWPs for water services

The study further analyzed the challenges of the system from two sides, MWAUWASA and the customers.

4.3.1 From MWAUWASA'S Perspective

The interview conducted between the researcher and Commercial Manager revealed that there were internal and external challenges that arise from the use of M-Pesa system. One of the major internal challenges that result from the M-Pesa usage is frequent (monthly) changing of the security password. This act result into inconveniences once a password is wrongly inserted or not changed on time as the system blocks the users and rectification of the error is done at the Vodacom headquarters. Externally, the challenges arise from customer's perception toward trust of the M-Pesa system; some customers are not troubled with queuing as they prefer paying their water bills physically as they need physical proof of their payments this result into the rise of long queues. Needless to say other customers are not conversant with the use of M-Pesa so they opt for cash payment. Last but not least some customers commit error in the process of paying their water bills through M-Pesa this leads to customer complaints about the system and in turn can deter the latter from fully utilizing the system in effecting their transactions.

The result in (Table 4) indicate that 87.1% of MWAUWASA staff claimed that system delays due to internet problems results to increase in customer complaints about the system's efficiency (65.7%) this in turn deter MWAUWASA clients from fully utilizing the M-Pesa system of payment and in turn slows down the pace of M-Pesa adoption by clients as it was revealed by (Zhou, 2013) that service providers need to deliver quality system, information and services in order to facilitate users' post-adoption usage of mobile payment

4.3.2. From customer's Perspective

The results in (Table 5) revealed that over 70% on average, both customers complained about inefficiency of the system and delay of transaction and that return transaction messages take longer to be delivered. 83.1% M-Pesa customers saw that only Vodacom subscribers can pay their bills through M-Pesa. In contrary many Cash payers over 81.4% are Vodacom subscribers as it is not a big challenge to them as only 18.6% are not accessing Vodacom services. Over 88.7% Cash payers at MWAUWASA claimed they use M-Pesa to facilitate other transaction where only 11.3% do not use M-Pesa for any Transaction. Some argued that, they require documentation though receipts of which cannot be provided by M-Pesa system. Furthermore, awareness of the M-Pesa system is not significant because only 18.5% are not aware. The low rate of adoption is purported by a study done by Foster *et al.*, (2012) that one among the setback being lack of physical proof of payments needed by MWAUWASA clients. These results clearly show that despite M-Pesa system being popular together with the benefits it brings, users are still reluctant to use it based on their perception on the ease of use as supported by Davis (1989)

Table 5: Challenges facing MWAUWASA customers

M-Pesa Clients' view on M-Pesa system	%	Cash clients' view on M-Pesa system	%
Challenge of cost per Transaction	74.6	M-Pesa system is slow due to feedback delay	80.3
Time consuming in payment process	9.9	Return message take longer time	77.4
Minimum balance of money in M-Pesa account	18.3	Non M-Pesa user are not aware of its existence	18.5
Inefficiency of the system and delay of transaction	56.3	Non M-Pesa user are not Vodacom subscriber	18.6
Access to Vodacom subscriber	83.1	Non M-Pesa user do not use M-Pesa in any transaction	11.3

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study concludes that M-Pesa system has reduced operation cost through reduced need of task force, reduced field work and transport cost as well as overtime working hours. Efficiency in service provision has increased through reduction in customers' complaints, queues, petty corruption and delay of bill payments. The challenges of M-Pesa system to both MWAUWASA and its clients need to be addressed fully. These challenges are; frequent changing of the systems password, inefficiency of the system due to internet problems, lack of physical proof (receipts) of the payment done by M-Pesa customers and adverse customer's attitude towards M-Pesa usage.

5.2 Recommendations

The results have several important implications. MWAUWASA should particularly concentrate on the ways of improving the adoption rate of M-Pesa. An increase in adoption rate of M-Pesa is paramount as it leads to an increase in revenue collection as evidenced by the rise in revenue collection efficiency since its inception

MWAUWASA should focus on delivering quality M-Pesa system that meets the needs of its clients so as to improve users' adoption rate and once this is done it will be able to realize a cashless strategy of payments that it envisage to achieve as it was revealed by (Zhou, 2013) that service providers need to deliver quality system, information and services in order to facilitate users' post-adoption usage of mobile payment

Marketing communications should be used to deliver message that mobile payment services are pleasant and entertaining, thus increasing consumers' perceived usefulness and hence improve the adoption rate

Future studies

Researchers suggest that further studies should focus on impact of volume of transactions, transactions costs and the platform on the adoption on mobile money services.

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