

Assessment of Factors for Adoption of Electronic Payment System by Client on Receiving Health Services at Kilimanjaro Christian Medical Center

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Abstract

This study aimed to assess the factors for adoption of electronic payment systems by clients receiving health services at Kilimanjaro Christian Medical Center. The study was conducted at KCMC hospital and will involve all patients who are attending at KCMC hospital and use electronic payment systems for medical care. The study was guided by two theories: Innovation Diffusion theory and Unified theory of acceptance and use of technology unified. Cross sectional survey design and quantitative approach were used. A Simple random sampling used to select the study participants. The study was conducted at KCMC hospital Cancer Care Center with a population of 301 patients per month who use electronic payment systems. Questionnaire was used to collect primary data where 172 participants were involved in this study. Descriptive analysis was done and results were presented by frequency, percentage and mean value in tables. Based on findings for adoption of electronic payment most of indicators showed ability of an electronic payment system protect of customer privacy with mean value 4.45, They feel the risk associated with electronic payment system is low with mean 4.12, the Confidential information is delivered safely to consumers with mean 4.07 and they trust the electronic payment system will not lead to transaction fraud “with mean 4.07. However the restricted access of user data has a low mean of 3.48. The study concludes that the most indicator factors for adoption were the ability of an electronic payment system to protect customer privacy, low risk associated with electronic payment and confidential information is delivered safely to consumers. The study recommends that hospital management initiate training which is necessary to equip patients with skills on the use of electronic payment especially on challenges that may occur due to the electronic payment. Training will provide more awareness concerning the challenges and will increase the awareness among users on the use of electronic payment.

Keywords: Electronic payment system, clients, Adoption, Health delivery

1. Introduction

Electronic payments, or e-payments, are a way of making transactions or paying bills online or through an electronic medium, without the use of physical checks or cash (Shaban, 2020). The most popular methods of electronic payments include credit cards, debit cards and virtual cards (direct deposit, direct debit, and electronic checks). Electronic payment systems enable faster payment, better tracking of transactions, transparency, reduced lead time, cost saving and promote trust relationships between buyers and sellers.

Payment for hospital services is made by various means to include public and private, direct and indirect (Urio, 2020). Each of these methods has different implications for hospitals' financial health. For example, in the United States, public payments have become a larger proportion of hospitals' revenue at a time when state and federal governments have sought to control their health care costs by reducing reimbursements and establishing managed care programs for Medicare and Medicaid. Medicare and Medicaid presently reimburse hospitals at only 95% and 71% respectively of their current costs. In the past, private payments have compensated for lower public reimbursements and charity care (Chellapalli & Srinivas Kumar, 2020).

Private payers, who are largely employers, have also sought to contain increasing health care costs (Chellapalli & Srinivas Kumar, 2020). Managed care fee schedules, capitated rates, and discount rates have established restrictions on private reimbursements and transferred more of the financial risk of care to hospitals in both the developed and developing economies. This has an impact on hospitals' flexibility to shift costs from public to private payers. The good part of the story is that America, Europe and the rest of the developed economies are much more developed in terms of healthcare service provision, health insurance covers and technology in terms of the electronic payment systems which facilitate a better delivery of the health services (Chellapalli & Srinivas Kumar, 2020).

Nevertheless, the e-payment system has become more popular worldwide especially in governments and private organizations. In Africa, e-payment is characterized by widespread challenges. Poor telecommunications infrastructure, limited readiness by banks, behavioral constraints, inadequate legal and regulatory framework, low level of credit card access are among the constraints that have hindered the progress of e-payments (Maagi, 2018).

The Government of Tanzania through the Ministry of Finance and Planning (MOFP) and other stakeholders implemented the Government e-Payment Gateway (GePG) system in 2017. The aim is to improve revenue collection management, by harmonizing revenue collection processes and improve revenue management by taking advantage of the technological advancement and use of mobile payment platforms. The government imposes directives to all its public institutions to migrate from cash payment system to e-payment system through its newly introduced e-payment system announced at a GePG annual summit organized by the Ministry of finance and planning held on 14th December 2018 (Urio, 2020). The study done by (Mangana & Katundu, 2018) found out that healthcare clients preferred to use EPS. The intention to use EPS being banked were significant factors influencing both preference of EPS and intention to use EPS. The study recommended that, in order to hasten adoption of EPS in Tanzania, it is important to address the identified barriers and encourage clients to keep their money in and use the services of banks.

According to (Mbwayo, 2017) through electronic payments customers can easily pay their bills without physically visiting the bank premises. There are several electronic payments options available to customers which include: Electronic Funds Transfer, Automated Teller Machines, debit cards, credit cards or smart cards, Electronic Wallets, Mobile Banking, Money Transfer, Person to Person Payments, Electronic Cash Systems, Electronic Cheque systems and Internet Payments.

In February 2012, the CRDB Bank launched electronic banking products where e-payment services were among other products that included Internet banking, Mobile banking, Sim banking, Tembocard, Automatic Teller Machine (ATM), Money transfer and Shop on line services. On 18 March 2013 the hospital was contracted and enabled by the bank to access and use the EPS (Mangana & Katundu, 2018).

As an adoption stage backed up by the government instruction, Kilimanjaro Christian Medical Centre had to use the e-payment system. The EPS involves three main stakeholders: patients, the bank (CRDB) or agent of the bank where the patients need to process electronic cards and preload funds for the purpose of making hospital payments. The third actor is the hospital through a Point of Sale (POS) center where payments for medical services are cleared (Mangana & Katundu, 2018). The modes of payments in the hospital are said to be irregular and are not made at par. That is, they are made according to the stage of treatment. Clients are required to pay through CRDB and present the card to the cashier to clear payments. Many patients have a tendency to preload their cards with an amount of money equivalent to what is required at one stage (Mangana & Katundu, 2018). Kilimanjaro Christian Medical Center hospital electronic payment system is done through CRDB bank by card and control number. In recent years Kilimanjaro Christian Medical Center has introduced automation features that allow clients a flexible payment modality. The question that has normally surfaced is as to if the EPS has improved the provision of health services to clients at KCMC or actually it has complicated the process. This study is directed at assessing the factors for adoption of EPS to delivery of health services at Kilimanjaro Christian Medical Center.

2. Statement of the problem

The electronic payment system is becoming essential for facilitating daily work. It is a financial commitment that includes both sellers and buyers facilitated by the use of electronic communication. An innovation of the internet has made electronic payment (e-payment) systems (EPS) a necessity for online transactions. A report (Foster et al., 2014) in Tanzania e-payment adoption rates are low in urban Africa, to the extent that one service provider records a 1% usage rate of its e-payment systems. According (BOT, 2020), Tanzania has experienced significant growth in the use of e-money over the last decade. Around 43 percent of the Tanzanian population actively used mobile services in 2019. Digital technologies play an important role in the country's second Five Year Development Plan (FYDP II). Moreover, the development of digital credit services in Tanzania has played a significant role in the evolution of financial inclusion, which increased to 65 percent in 2017.

Electronic payment systems enable faster payment, better tracking of transactions as well as transparency, which in turn reduces time, enhances security, induces cost savings and promotes trusting relationships between buyers and sellers. Introducing electronic systems in an

organization aims to increase efficiency and effectiveness. Clients are still discouraged to use the electronic payment for medical treatment since they experience difficulties in getting services where the network is weak or many patients wait long to make payments (Mangana & Katundu, 2018). Global adoption of electronic payment created financial needs that could not be adequately fulfilled by traditional payment systems, and this triggered investigation into electronic payment systems – electronic mechanisms for enabling conventional payment systems or mechanisms that use digital currency technology.

Introducing electronic system at KCMC aims to increase efficiency and effectiveness. However, the opposite has been the case in using the system. Clients are still discouraged to use the electronic payment for medical treatment since they experience difficulties in getting services where network is weak or many patients wait long to make payments. Since the introduction of EPS, very little is known about the adoption rate of electronic payment systems, especially by the patients. Therefore this study is sought to assess the factors for adoption of electronic payment system by clients at the Kilimanjaro Christian Medical Centre, Tanzania.

3. Theoretical framework

Rogers developed this theory to explain the diffusion of the innovation process (Dibra, 2015). The spreading out of innovation is a process by which, through certain channels, novelty is communicated among the members of a social system over time. According to the theory of Rogers, there are four elements involved in the process of idea, practice, or object dissemination: it should be classified as innovation, it must be communicated through certain channels, it must be adopted among members within a social system, it must take into account duration or the time factor. The theory highlights the internet as the component that influences how members of the community adopt new technology. The following stages include early adopters, early majority, late majority, and finally the laggards. Therefore, the process begins with innovation. Innovation may be an idea, practice, or object that is perceived as new by potential adopters and should be considered as desirable to adopt. Characteristics of innovation help to explain different levels of the adoption of innovation. One of the core strengths of the diffusion of innovation theory lies in its applicability (Bakkabulindi, 2014). A large volume of studies across multiple disciplines have utilized the theory as framework; it has yielded similar results across the board, from journalism studies to health communication, thus confirming the diffusion process. Weakness of the theory however the limitation of the theory works better with adoption of behaviors rather than cessation or prevention of behaviors. It doesn't take into account an individual's resources or social support to adopt the new behavior or innovation (Pesi Murphrey, 2000).

4. Empirical Literature review

A number of authors have studied the factors that influence the successful adoption of EPS, with an emphasis on organizations or consumers. For instance, (Takele & Sira, 2011) carried out an examination to examine from an organizational perspective a number of factors affecting internet banking adoption in Oman. The results of the study give the adoption of internet banking in the Oman financial sector a realistic picture. Several interesting observations have been discovered to be barriers such as security, lack of corporate strategic planning and software, lack of top-level management support, severe shortages in IT skills, and lack of support from the government. The results were divided into four major categories, i.e. the issues of security, infrastructure, law and regulation and social and cultural problems. Consequently, economic, socio-organizational,

political and technical factors together comprise the knowledge gap, which relates to factors that the current research seeks to address from the customer standpoint.

The e-payment system is becoming essential for facilitating daily work. It is a financial commitment that includes both sellers and buyers facilitated by the use of electronic communication. According to (Alzubaidi, 2018) e-payment importance of those factors in the context of e-payment and seemed to be consistent with users' perception of e-payment. The ease of use has a significant effect on consumers' adoption of the e-payment system.

A descriptive research design done by (Mbwayo, 2017) in Kenya described that, the main factor of clients adoption of electronic payment were to investigate information security, infrastructure, technology, regulatory framework and top management support on adoption of electronic payments by commercial banks. The findings indicated that, Information security is mainly determined by the electronic payment channel and infrastructure, customer information updates are kept consistent with the information security programs and procedures. Also monitoring tools in place should be very effective and notify the monitoring team immediately when there is an issue and the equipment available are able to meet the needs of electronic payments to customers. The presence of technology such as Internet use has increased investor risks through exposure to cyber-attacks and direct marketing of unregulated financial services and frauds, The bank has put in place adequate mitigation measures against technology risks, the use of the technology has ensured fast and efficient services to the customers and the disaster recovery and back-up system comes in handy when the primary bank system experiences a downtime.

A cross section study done by (Mangana & Katundu, 2018) the findings of results indicate that behavioral intention to use electronic payment systems were attitude toward EPS and ease of use of EPS. These reasons were statistically significant to use electronic systems, which indicate a positive attitude shown by respondents to the use of EPS. However, usefulness of EPS was not a predictor of behavioral intention to use EPS. The most significant prediction was mainly due to attitude toward EPS to ease of use of EPS; both variables explained 67.5% of the variation. The findings of hypothesis shown that, perceived ease of use (PEOU) do not influence client's intention to use EPS, Perceived usefulness (PU) do not influence client's behavioral intention to use EPS, Attitude toward electronic payment systems do not impact client's behavioral intention to use EPS and Perceived ease of use do not impact client's intention to use EPS.

However the introduction and use of electronic payment instruments holds the promise of broad benefit to both business and consumers in the form of reduced costs, greater convenience and more secure, reliable means of payment and settlement for a potentially vast range of goods and services offered worldwide over the internet or other electronic networks. Interoperability plays an important role in electronic payments and refers to the ability of different systems and sometimes different products to seamlessly interact or exchange data (Lazo & Casu, 2017).

From the previous studies, a description in the background and literature review about the adoption of electronic payment systems in getting health services was done. Most of the studies do not indicate the extent to which various factors affect the adoption of electronic payment which creates a knowledge gap. Also most of the studies were based on electronic payment systems in banks, payments through mobile phones, payment of various service bills like water

bill, electricity and payment of commodity and goods services. This study will be concentrated in the electronic payment system in health service and the study will be done at Kilimanjaro Christian Medical Center. The study examined the adoption of electronic payment systems at Kilimanjaro Christian Medical Center. Therefore, this study helped to answer the existing gaps with other researchers on service offering organizations especially in the use of electronic payment systems.

5. Methodology

Cross-sectional survey design was employed in this study to investigate assessment of clients adopting electronic payment systems on getting health services. The study used a quantitative approach. This design was appropriate to measure different assessments of adopting electronic treatment payment systems on receiving health services by clients at KCMC Hospital. The quantitative research approach is relevant as the weakness of one can be complemented by the strength of the other approach. The population of the study involved all patients who visited KCMC hospital Cancer Care Center and used an electronic payment system for medical care. The outpatient number at Cancer Care Center was 301 clients per month. A simple random sampling was done to select subsets of a population. In this sampling method, each member of the population was given an equal chance of being selected.

The sample size was calculated using Yamane approach Through this formula was outpatient attending at CCC clinic for health services (Yamane 1967).

$$n = \frac{N}{1 + N(e^2)}$$

Whereby:-

n= estimated sample size

N=population size 301Attend at KCMC Cancer Care Center per month for cash payment patient

e=Critical value from 95% confidence level (0.05)

$$n = \frac{301}{1 + 301(0.05^2)} = 171.75$$
$$= 172$$

Thus a minimum of 172 outpatients at CCC clinic who pay cash for health service through CRDB bank electronically were selected for this study.

Primary data was collected from clients where questionnaire tools were used to collect data from the participants. Likert scale was used to assess the object of adoption of electronic payment system Analysis for the quantitative data was done using mainly the descriptive statistics where frequency, percentage and mean value were presented. Discussion of findings supported by the literature and theories was used to enhance the findings. The validity and reliability were used to test the questionnaire before data collection if were usefully to use.

6. Findings and discussion of results

The analysis and discussion of factors for clients' adoption on the use of electronic Payment system on receiving Health Services at KCMC Hospital is narrated. Findings in table below show that five out of eleven indicators where agree with adoption of electronic payment were they trust the ability of an electronic payment system to protect my privacy with mean of 4.45, while other respondents agreed that the risk associated with e-payment system is low with mean 4.12, Also other respondents agreed on Confidential information is delivered safely to consumers with mean 4.07 and the remaining respondents agreed that they trust the electronic payment system will not lead to transaction fraud with mean 4.07. And six out of eleven showed relatively neutral indicators with adoption of electronic payment. However the restriction access has a low mean of 3.48 out of eleven indicators.

The results of the study suggested that security related concerns will influence user's adoption intention of mobile e- payments. Several variables associated with security were tested which included the privacy protection, restricted access of personal information, confidentiality of transaction, transparency of transaction, traceability of transaction. The confidentiality of transaction stood out from these items to be one of the most significant as is indicative of the mean and standard deviation scores with 100% were agreed (Mwafise & Stapleton, 2012). The findings in the confidentiality of transactions are significant with our result where the majority of patients 80.8% agree with mean value 4.07.

Table 1: Clients' adoption of electronic Payment system (n=172).

S/N	Clients' adoption of electronic Payment system	5 SA		4 A		3 N		2 D		1 SD		Mean
		F	%	f	%	f	%	f	%	f	%	
1	Protection of Privacy	63	36.6	66	38.4	15	8.7	16	9.3	12	7.0	3.88
2	Restricted access of user data	32	18.6	45	26.2	49	28.5	34	19.8	11	6.4	3.48
3	Transaction Confidentiality	42	24.4	71	41.3	33	19.2	16	9.3	10	5.8	3.69
4	Transparency of transaction	49	28.5	74	43.0	20	11.6	20	11.6	9	5.2	3.78
5	Payment trustworthiness system	64	37.2	71	41.3	19	11.0	14	8.1	4	2.3	4.03
6	I trust the ability of an e-payment system to protect my privacy	76	44.2	69	40.1	16	9.3	7	4.1	3	1.7	4.45
7	I feel the risk associated with e-payment system is low	72	41.9	68	39.5	20	11.6	5	2.9	7	4.1	4.12
8	Confidential information is delivered safely to consumers	60	34.9	80	46.5	23	13.4	2	1.2	7	4.1	4.07

9	I trust the e-payment system will not lead to transaction fraud	63	36.6	76	44.2	20	11.6	8	4.7	5	2.3	4.07
10	Simple to use device	54	31.4	65	37.8	16	9.3	30	17.4	7	4.1	3.75
11	Learning to use an e-payment is easy	55	32.0	67	39.0	29	16.9	17	9.9	4	2.3	3.88

Source: Field Data (2022)

Study done on Factors affecting consumers' perception of electronic payment describe as follows in benefit it saves my time and cost for using an e-payment system with mean value of 3.43, E-payment system is convenient for me with mean of 3.39, Speed of e-payment system flow is faster than traditional payment system 3.37 and it is easier to conduct my financial transaction with mean of 3.52. And the overall mean for benefit was 3.42. Moreover, on the side of security it indicates that Matters of security have significant influence on respondents in using an e-payment system with a mean of 3.36 (Wendy, 2013).

Again the study on factors affecting consumers' perception of electronic payment examine the determinants of the significant factors that influence consumers' factors of e-payment this finding is similar to a study conducted in Saudi Arabia where felt the risk associated with e-payment system is low with the mean of 3.358, Confidential information is delivered safely to consumers with mean of 3.948. And on the matter of benefit showed that Speed of e-payment system flow is faster than the traditional, however with a low mean value of 2.24 and it saves respondents time and cost of using an e-payment system with the mean of 2.288. However, the majority agreed that learning to use an e-payment is easy with a mean of 4.096 (Fahad & Othman, 2018). A study done by (Rezaei Sajad, 2013) results reveal that benefits, self-efficacy, and ease of use apply significant influences on consumers' perception towards e-payment. This is similar to these study findings where 69.2% agree e-payment is simple to use.

7. Conclusions and recommendations

7.1 Conclusions

Based on the results of the study, respondents are satisfied with e-payment in receiving health service at KCMC. The findings of the study indicated that there is a high level of agreement between e-payment factors and health services provision at KCMC. This was indicated by patients attending at KCMC for medical care where the majority of respondents agreed that the use of e-payment was trusted more and ability to protect privacy. The risk associated with the e-payment system is low, Confidential information is delivered safely to consumers; they trust the e-payment system will not lead to transaction fraud. This indicated that the factors of ability of e-payment system to protect privacy of customer, the low risk of e-payment system, Confidential information is delivered safely to consumers and to trust the e-payment system did not lead to transaction fraud were the factors patients were more likely face from the use of electronic payment system in delivering of health services. Based on the results in patient's perception on the use of e-payment, the findings conclude that an e-payment system is better than traditional payment channels. This was associated with the use of e-payment in receiving health service rather than the use of traditional ways. Furthermore, confidential information is delivered safely to customers and is well maintained.

7.2 Recommendations

The study recommends Kilimanjaro Christian Medical Center hospital management to have training that will equip the client's skills on the use of electronic payment especially on challenges that may occur due to the electronic payment. Those training should provide more awareness concerning challenges and will increase the awareness on the use of electronic payment.

References

- Alzubaidi, H. (2018). Factors Affecting Consumers' Pro-environmental Behaviours in Saudi Arabia. *European Journal of Business and Management*, 10(No.27), 303–314. https://doi.org/10.1007/978-3-319-75013-2_23
- Bakkabulindi. (2014). A call for Return to Rogers' Innovation Diffusion Theory. *Makerere Journal of Higher Education*, 6(1), 55. <https://doi.org/10.4314/majohe.v6i1.4>
- BOT. (2020). *Digital credit regulation in Tanzania*.
- Chellapalli, T., & Srinivas Kumar, D. V. (2020). Role of customer perceptions in the usage of electronic payment systems. *International Journal of Scientific and Technology Research*, 9(2), 4336–4340.
- Dibra, M. (2015). Rogers Theory on Diffusion of Innovation-The Most Appropriate Theoretical Model in the Study of Factors Influencing the Integration of Sustainability in Tourism Businesses. *Procedia - Social and Behavioral Sciences*, 195, 1453–1462. <https://doi.org/10.1016/j.sbspro.2015.06.443>
- Fahad, A. A., & Othman, A. (2018). Factors Affecting Consumers' Perception of Electronic Payment in Saudi Arabia. *European Journal of Business and Management*, 10(27), 36–45. www.iiste.org
- Foster, T., Hope, R., Krolikowski, A., & Cohen, I. (2014). Mobile water payments in urban Africa: Adoption, implications and opportunities. *Global Water: Issues and Insights*, May. <https://doi.org/10.22459/gw.05.2014.18>
- Lazo, E., & Casu, O. (2017). Towards a new transformation of epaymentsparadigm: a case study on Moldovan public services. *KTH Industrial Engineering and Management*, 1–48. <https://kth.diva-portal.org/smash/get/diva2:1193669/FULLTEXT01.pdf>
- Maagi, B. (2018). Systems in Tanzania : Challenges and Risks. *Business Education Journal*, II(I), 1–12.
- Mangana, K., & Katundu, M. (2018). Determinants for Effective Implementation of Electronic Payment System by Hospitals in Tanzania: A Case of the Kilimanjaro Christian Medical Centre. *Business and Management Horizons*, 6(2), 47. <https://doi.org/10.5296/bmh.v6i2.14083>

- Mbwayo, E. M. (2017). *Factors Influencing Adoption of Electronic Payments By Commercial Banks in Kenya* (Issue December). University of Nairobi.
- Mwafise, A. M., & Stapleton, L. (2012). Determinants of user adoption of mobile electronic payment systems for microfinance institutions in developing countries: Case study cameroon. In *IFAC Proceedings Volumes (IFAC-PapersOnline)* (Vol. 45, Issue 10). IFAC. <https://doi.org/10.3182/20120611-3-IE-4029.00010>
- Okumu, E. L., & Kiflemariam, A. (2019). Effects of Employee Training on Employee Performance : A Case of the Judiciary of Kenya. *International Journal of Research in Management, Economics and Commerce*, 08(09), 39–47. <https://www.researchgate.net/publication/336121553%0AEeffects>
- Pesl Murphrey, T. (2000). Perceived Strengths, Weaknesses, Opportunities, And Threats Impacting The Diffusion Of Distance Educaton Technologies In A College Of Agriculture And Life Sciences. *Journal of Agricultural Education*, 41(4), 39–50. <https://doi.org/10.5032/jae.2000.04039>
- Rezaei Sajad. (2013). Factors affecting consumers' perception of electronic payment: an empirical analysis. *The Eletronic Library*, 23(4), 465–485.
- Shaban, R. (2020). *Factors Influencing the Use of Electronic Payment System Among The Bank Customers: The Case of NMB Bank*.
- Takele, Y., & Sira, Z. (2011). Analysis of Factors Influencing Customers' Intention to the Adoption of E-Banking Service Channels in Bahir Dar City: An Integration of TAM, TPB AND PR. *International Arab Journal of E-Technology*, 2(1), 56–64.
- Urio, W. (2020). *Assessment of government electronic payment gateway system in revenue collection*. (Vol. 2507, Issue February). Institute of Accountancy Arusha.
- Wendy. (2013). Factors affecting consumers' perception of electronic payment: An empirical analysis. *Internet Research*, 23(4), 465–485. <https://doi.org/10.1108/IntR-09-2012-0199>