SCHOOL OF PUBLIC HEALTH

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ACCEPTANCE AND USE OF MOBILE PAYMENTS IN HEALTHCARE DELIVERY AMONG PRIVATE PROVIDERS IN THE AYAWASO MUNICIPALITY

BY

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DECLARATION

I, William Azietsi-Bokor hereby declare that this project work is a result of my independent work undertaken under supervision. References to other works have been duly acknowledged. I further declare that this research work has not been submitted for award of any degree in this institution and other universities elsewhere.

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DEDICATION

This dissertation is dedicated to my wife Edith Dianne Clehnam and my children Adelaide, Peacelove, Lovelyn and Lovel

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ABSTRACT

In recent years, mobile phone use in healthcare delivery has been the focus of healthcare research. Of great interest to researchers is to study and understand the acceptance and use of mobile payments in health delivery since mobile payments serves as a complementary service to mobile health. Mobile payments provides a solution to the growing moral hazards and security risks associated with cash payments in healthcare delivery and also lessens the institutionalization of informal payments in health delivery.

A census was conducted on all health facilities within the Ayawaso municipality and the results analyzed with the help of structural equation modelling (SEM) via the AMOS software package in SPSS version 22. The constructs were tested and found to have high validity. Fifty-three percent of providers were found to be currently accepting mobile payments at their facilities.

The study concluded that performance expectancy and perceived cost are strongly associated with the intention to use mobile payment systems and the actual use of mobile payment systems and recommended that healthcare providers should analyze the task-technology fit of payments and liaise with mobile money operators to shorten the series of steps needed towards completion of mobile payments to save time for patients and providers.

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CHAPTER ONE

INTRODUCTION

1.1. **The emergence of mobile phone technology**

Mobile phone technology has seen a marked transformation since the first mobile phone call was made on April 3, 1973. Even though the first mobile phones were not designed with the average consumer in mind, there has been widespread diffusion of mobile phones even to the most remote corners of the world. Mobile phones have been responsible for changes in interpersonal relationships, social lives, and even self-expression (Livingstone, 2008). It has been described as a leapfrog technology, which has helped developing countries, (even those with relatively poor infrastructure) to sidestep fixed-line technology unlike most developed countries (The Economist, 2008). The entire world has seen substantial increases in the numbers of those who use mobile phones in the past five years (Curioso, 2006; WHO, 2008).

There has been a surge in mobile phone use and mobile data subscription which stood at 22.1million (77.58%) by the end of July 2017 (NCA, 2017). According to GSMA, (2017), mobile phone dispersion and use is paramount in Ghana's digital revolution. Mobile provides the most inclusive and pervasive means of connecting to the internet which is very important to the growth of Ghana's economy (Goodluck, 2017).

1.2. Mobile Financial transactions in healthcare delivery

Over the past few years, the payment landscape in Ghana and some parts of the world have been altered by the influx of technologies such as the mobile phone. More and more businesses and their customers are adopting mobile payments because of its mobility, convenience and ease of use. Mobile money can be regarded as a developing phenomenon

and a prospective payment tool with a high level of public acceptance (Ondrus, Lyytinen, & Pigneur, 2009; Zhu 2010). Mobile money may be termed as electronic cash backed by corresponding value of the Bank of Ghana currencies which is stored using the Subscriber Identification Module (SIM) in a mobile phone as an identifier (BoG, 2017). Mobile money is simply defined as the use of mobile phones to access financial services. It is a groundbreaking service that utilizes information communication technology (ICT) and non-bank retail channels to spread the delivery of financial services to clients who cannot easily be reached cost-effectively with traditional branch-based financial services (GSMA, 2013). Its uptake helps Government's cash-lite economy agenda, ensures financial inclusion and has the potential to reduce poverty. It is issued currently in Ghana by four telecom operators; MTN, Tigo, Airtel and Vodafone. It is mainly used to send value from person to person (peer-to-peer) and for paying for things such as utility bills, DSTV bills, buying airtime, micro-credit and micro-insurance (BoG 2017).

Quite recently, there has been increasing efforts at harnessing mobile functionalities such as mobile payments to enhance financial transactions in healthcare delivery. Most mobile money operators are partnering other organizations to provide insurance covers by way of hospital bill payments. MTN and Airtel have partnered aYo and MicroEnsure, respectively to provide insurance for their subscribers (Myjoyonline.com, 2017; MicroEnsure, 2017). In Kenya, several people's health seeking behavior have been transformed by dedicated mobile health wallets called M-Tiba which was developed by Safaricom, CarePay and PharmAccess. M-Tiba allows users to send, save and receive dedicated funds to access healthcare services using their mobile phones. This innovative health financing mechanism has been able to help communities' pool risks to finance healthcare through a mechanism similar to the micro savings (susu) schemes in Ghana. This functionality of mobile phones makes it possible for individuals, groups and communities to save and access health easily while allowing donors,

corporate institutions to channel money directly into people's mobile health wallets which is ring-fenced for the payment of healthcare services.

According to Sherri, Heymann, Riley, & Taddese (2013), public health systems rely heavily on cash for payments for medical services; for salaries of healthcare workers, during purchase of drugs at pharmacies etc. It is increasingly becoming evident that digital payments in rural, remote settings are safer, quicker and easier. The likelihood of fraud drops as fewer hands are needed to transfer the money. A digital payment allows for easy data collection, auditing, and transparency, all of which is essential in health planning. In Tanzania, the Comprehensive Community Based Rehabilitation hospital through its partnership with the Vodafone Foundation has transferred monies into the wallets of obstetric fistula patients to attend hospitals (Vodafone, 2015). In a similar manner, a not-for-profit, D-tree and Zantel's partnership in Zanzibar ensured that over 10,000 births occurred at a hospital instead of home (HFG, 2015). This was done by transferring money into the mobile wallets of pregnant women to attend hospitals. Through his own social enterprise, Dr. Asher Hasan in Pakistan, has encouraged payment of health insurance premiums for workers through mobile money and the purchase of medicines through same (The Guardian, 2014).

Mobile money acceptance by subscribers of telecom companies is increasing in Ghana and its use for the payment of goods and services is expected to become the 'new normal' among payment systems in Ghana. Are health providers willing to put the needed systems in place to accept mobile money payments for services rendered to patients? The study hopes to examine the acceptance and use of mHealth payment solutions in healthcare delivery among private healthcare providers in the Ayawaso Municipality of the Accra Metropolitan area.

1.3. Problem statement

The acceptance and use of mobile payments in retail business in Ghana has been explored by researchers. Owusu-Agyeman & Offe (2016) found that while 50.6% of their respondents were of the view that mobile money services will immensely enhance their businesses and improve on their services to customers, only 9% of them were conversant with the use mobile money for business purposes. Dzokoto & Appiah (2014) also noted that even though mobile money knowledge and use has increased, it has not become a major means of payment yet. They also noted that barriers to mobile money uptake remain in the areas of regulatory, partnership, and education that hampers the growth of the mobile money industry in Ghana. While uptake of mobile money payment systems appears to be increasing in other industries, little is known about uptake in the health care industry.

Healthcare delivery in developing countries depend on large amounts of cash transactions. This dependence on cash for financial transactions results in inefficiencies, enables leakages, and carries security risks (Sherri et al, 2013). There are also moral hazards associated with handling of physical cash by cashiers in some healthcare facilities in that some cash collected ends up in private pockets which reduces the amount of funds available for running healthcare facilities. Cash payments in health delivery has also led to the institutionalization of informal payments in some health facilities (Stepurko, Pavlova, Gryga, Murauskiene & Groot, 2015). Informal payments breeds corruption within the healthcare system and deprives vulnerable groups access to care (Chereches, Ungureanu, Sandu & Rus, 2013). Additionally, the risk of loss through robbery is high when cash collected is being transferred to banks. Other losses not normally quantified by health providers is the valuable time lost during transfer and banking of cash collected.

Based on the challenges identified, there is the need to explore current trends in mobile money use in the healthcare sector and investigate drivers to uptake of mobile payments in the sector.

1.4. Justification for the study

The study of acceptance and use of mHealth payment systems and mobile financial transactions in healthcare delivery will reveal barriers to its adoption and conditions necessary for its acceptance. It will unearth information which could be used for the building of partnerships between telecom companies, healthcare facilities and development partners towards its uptake of mobile payments in the healthcare industry. Micro-insurance companies could directly pay healthcare providers' claims through mobile money to healthcare providers. This will eliminate catastrophic out-of-pocket payments and ensure access to quality healthcare for especially the ultra-poor.

An acceptance of mobile payment systems by care givers means that patients will be encouraged to perform mobile financial transactions during the delivery of healthcare services. Mobile payments by clients is predicated on its acceptance by providers. This will give speed and support to the Ghana government's cash-lite agenda and ensure financial inclusion. Healthcare facilities can see a clear picture of their cash flows and there will be improved efficiencies in managing financial transactions at healthcare facilities. This will increase the bankability of healthcare providers within the industry. Cash collected through mobile payment systems will be banked in situ which will eliminate risks upon acceptance by providers. The move towards acceptance and use of mobile payment systems by providers will provide ease of payment for patients with multiple payment platforms/methods which leads to convenience and patient satisfaction.

1.5. Theoretical framework

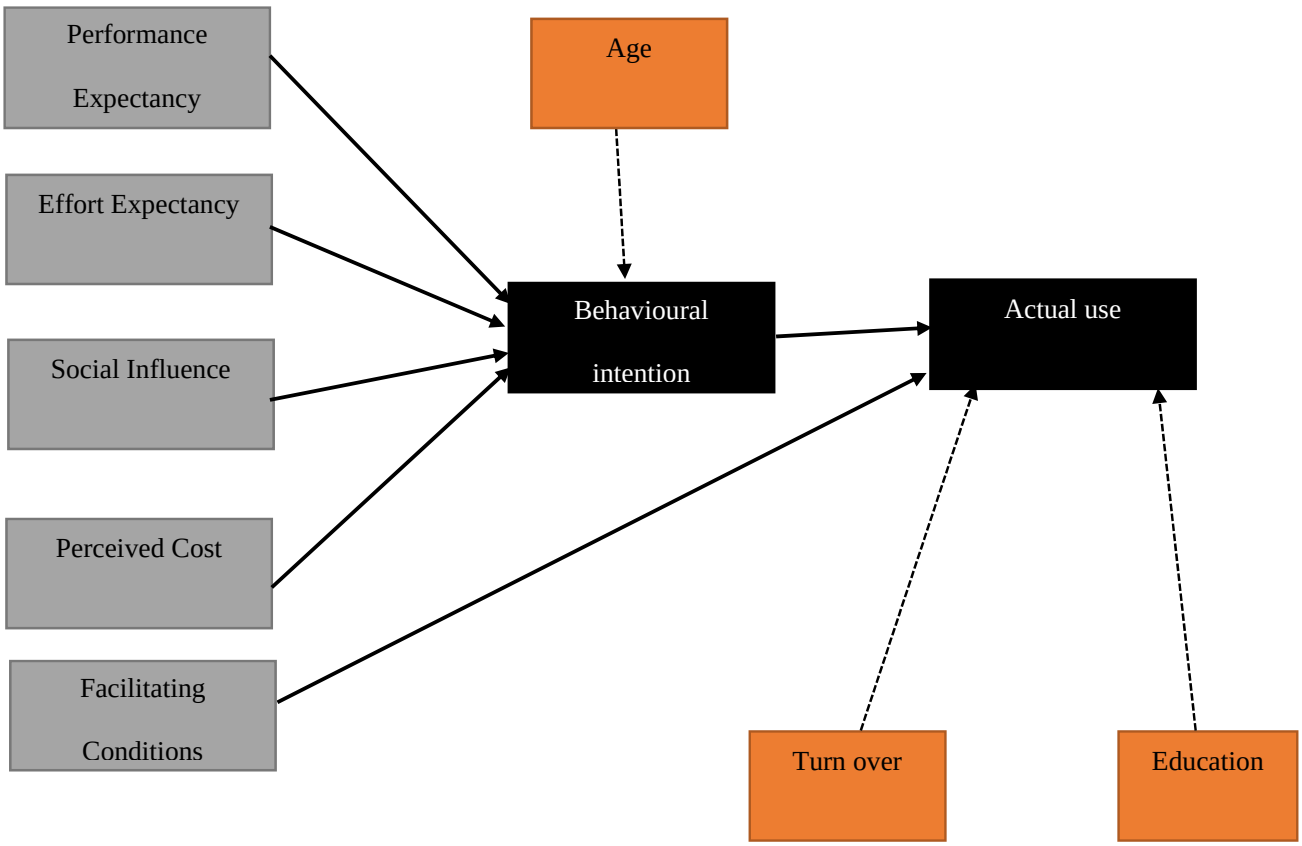

Figure 1. Theoretical framework. Source. Adapted from Venkatesh et al; (2003)

The framework was adapted from earlier works by Venkatesh et al (2003). The framework (Unified Theory of Acceptance and Use of Technology) was developed through a synthesis of several theories that are used for technology and information systems research. The UTAUT was chosen for this study out of the other theories because it has high popularity and empirical validation and was shown to have high performance. The theory was also proven to establish clear relationships between the core variables under consideration leading to prediction of actual use of technology. The novel UTAUT predicted intentions to use

technology based on perceptions likened to the technology acceptance model (TAM) which are performance expectancy, effort expectancy, facilitating conditions and social influences with several added moderators such as voluntariness of use, experience, gender and age (Venkatesh et al, 2003).

The framework has five independent variables, two dependent variables and three moderating variables. The independent variables (performance expectancy, effort expectancy, social influence and perceived cost) are expected to explain healthcare providers' intention to use mobile payments while facilitating conditions explain the actual use of mobile payments by healthcare providers.

Research Questions

1. What is the proportion of private healthcare providers using mobile payment systems?
2. What are the factors necessary for acceptance and use of mobile payment systems?
3. What are the factors associated with the intention to use mobile payment systems?
4. Is there a relationship between patient turnover and acceptance and use of payment system?

1.6. Research Objectives

General objective: To explore the acceptance and use of mobile payment systems in healthcare delivery among private healthcare providers.

Specific objectives

1. To determine the proportion of private providers using mobile payment systems.
2. To examine the factors necessary for acceptance of mobile payment solutions by healthcare providers.

3. To examine the factors associated with the intentions to use mobile payments systems.
4. To determine the relationship between patient turnover and use of payment system.

CHAPTER TWO

LITERATURE REVIEW

2.1. mHealth applications in healthcare delivery

The study of mHealth applications has gained the attention of researchers globally. Several findings have identified the importance of mHealth and its contribution to healthcare delivery. The adoption and increasing use of mHealth applications in healthcare delivery has also become very valuable to both healthcare providers and patients. The absorption of mHealth into mainstream health delivery systems is an exciting endgame for mobile health (Labrique, 2013). Over the years, many mHealth projects and strategies have been piloted in different settings to improve care delivery to disadvantaged populations. Many countries have devoted time and resources which are directed at developing mHealth. Alqahtani & Atkins (2017) reported the allocation of US$1.1billion for development of electronic health services in Saudi Arabia. A suite of mHealth strategies are currently available to support efforts at strengthening challenges within the healthcare delivery system. The following table depicts various mHealth applications that can be used to resolve health system challenges.

Table 1. Health system challenges and mHealth strategies to address them: Source: Adapted from (Labrique, 2013)

Health system challenge	**mHealth strategy**
Accountability coverage	Client registration Electronic medical records Unique identifiers Data collection and reporting Screening tools Civil registrations and vital events
Availability of health workforce	Human resource management Provider training Telemedicine
Readiness of medicines and equipment	Supply chain management Counterfeit detection
Accessibility of health facilities	Hotlines Client mobile apps Client information content subscriptions
Contact coverage	Behavior change communication (BCC) incentives
Continuous coverage	Persistent electronic health records Provider to provider communication Work planning Reminders
Effective coverage	Decision support Point of care diagnostics Telemedicine Reminders Incentives
Financial coverage	Mobile financial transactions

These strategies served as the defining moment for the development of applications targeted at addressing specific areas within healthcare delivery. Various studies have been done on the adoption and usefulness of mHealth applications. BinDhim, Shaman, Trevena, Basyouni, Pont (2014) surveyed 8,241 participants in their work to determine the usefulness of mobile phone apps for screening, monitoring and self-management of depression and found the results very promising. Im et al (2013) also found that there are benefits of smart phone use in providing therapy for stroke patients. Cuijpers et al (2009) underscored the importance of internet enabled cognitive therapy for the treatment of various cognitive disorders. They also noted that the amount of time spent on each patient by a clinician is less when compared to face-to-face interaction. This means more clients can be seen by clinicians when mHealth systems are deployed compared to conventional care provision. A post mHealth intervention evaluation exercise in a hospital at Riyadh revealed that patients waiting time had reduced by 30% and patients failing to show up after appointments had also dropped by 25% (Alqahtani & Atkins, 2017).

Polzien, Jakicic, Tate & Otto (2007) in a study based on social cognitive theory, evaluated the use of mobile phone in aiding weight loss. The program managed the nutrition and exercise regimes of participants by providing mobile online support for one group and traditional face-to-face for a control group. Online support was in the form of pulse monitors, online daily exercise record program and daily calorie intake. The results of weight loss by the online support group was found to be significantly higher.

The advent of mHealth has also ushered clinicians into the realm of communication through social media tools such as WhatsApp which is enabling interactions between healthcare professionals for effective management of cases. Payne, Wharrad & Watts (2012) reported the use of mobile phones amongst healthcare workers for purposes of medical

communication to range between 60% and 80%. Another study came to the conclusion that general surgeons and orthopedic surgeons perceive WhatsApp as a tool for quality improvement innovations in patient care among departments (Khanna, Sambandam, Gul, Mounasamy, 2015; Johnston et al, 2012). Due to its group chat functionalities, WhatsApp has the ability to reduce hierarchical dominance, bureaucracy and improve communication between junior and senior clinicians (Conn, Reeves, Dainty & Kenaszchuk; 2012; Johnston et al, 2012; Linares & Breeze, 2015).

According to Kissick (1994), mHealth hopes to fortify the iron triangle of healthcare; to improve quality, reduce cost and improve access. Most mobile health applications have been designed with patients in mind and there is little integration with provider systems. The mHealth spectrum now has about 45,000 application developers and over 3 billion mHealth applications were downloaded in 2015 (Research 2 Guidance, 2015). It is projected that 50% of all mobile phone users would have downloaded at least one mHealth application by 2017 (Research 2 Guidance, 2015). The top two mHealth applications that are currently used by customers are for wellness management, and chronic disease management (IMS Health, 2015). Kao & Liebovitz (2017) noted that self-diagnosis applications has the potential to be extremely useful in emergency cases or in resource-constrained settings. An example is the WebMD application that checks users' symptoms and to allow users to tick their symptoms and then possible diagnosis are generated for them.

Even though there is a high use of mHealth applications among consumers, these are not being fully integrated into provider healthcare systems because of barriers such as privacy and security concerns, inadequate evidence based literature and lack of proper regulatory supervision. There are also issues concerning how healthcare providers should cope with the large amounts of data that is churned out by these applications for their integration into provider systems.

2.2. mHealth adoption: Perspectives from Africa.

As telecommunication markets become of age, mobile phones in Africa are moving from simple communication gadgets into electronic platforms that support and enhance the delivery of services. This has tilted the development pattern regarding mobile phones from a communication and coordination cost reduction tool to a life changing one. (Aker & Mbiti, 2009). The increasing acceptance of mobile phones has spurred a considerable level of enthusiasm about its effect on the socioeconomic development potentials of Africa. Governments, newspapers, and telecommunications companies have all hyped the poverty-eradicating prospects of mobile phones (Corbett, 2008). The Economist (2008) featured an article which reported the unprecedented adoption of a gadget that was an expensive toy few years back but has now become a compelling force for socioeconomic development in the most poverty endemic countries in the world. According to Madon, Amaguru, Malecela, & Michael; (2014), the ability of countries and regions to be part of the digital media landscape is gradually being assumed to be a measure of economic development. Even though mobile phone penetration has been phenomenal, the penetration and use of one of the most important 'by products' of mobile invention (mHealth) is very low. Majority of the population is still stuck to the basic functions of the mobile phone - making and receiving calls.

Social scientists have attested that health information is not intermediated by technologies in a simple and straight forward way but always mediated in intricate and unpredictable ways (Bruno, 2005). The peculiarities of the African continent in terms of health technology diffusion are quite different from other continents. Challenges hampering effective healthcare delivery in most African countries are poor infrastructure and lack of healthcare professionals. Several needs are competing for less resources and this invariably limits the amount of resources available for investing in the health sector and for development of

mHealth systems. Adoption and use of mHealth strategies in Africa are largely directed at resource constrained areas and populations. About 43% of people in Africa are poor, accounting for a large percentage of the "bottom billion" who live below $1.25 a day (World Bank, 2016). Despite these challenges, some countries have wrought prodigious advancements in deploying mHealth strategies in healthcare delivery.

The Korle Bu Teaching Hospital is Ghana's foremost teaching hospital with daily outpatient attendance in excess of 1,500. Even though it is a referral facility, most patients use it as their primary healthcare facility. This has become a big challenge for the hospital amidst stretched resources and inadequate healthcare staffs. To address this challenge, a mobile medical expert system (mMES) that employs cloud computing and text messaging was instituted. Healthcare seekers first register as users through the system, interact with it and the medical doctor through cloud computing and mobile technology devices. The medical doctor then advises the patient through their mobile devices based on the interaction with the system (Asabere, 2012).

The use of text messages has also revolutionized the fight against counterfeit drugs. A Ghanaian technology company mPedigree which partners governments in Africa and drug manufacturers; empowers final consumers of drugs to check the authenticity of drugs. It has put in place systems that allow genuine drug producing companies to put unique codes on their packaging. Consumers simply text these unique codes for free to a company that maintains the system. Consumers are then informed instantly whether the drug is genuine or not (Sambira, 2013).

The menace of neglected tropical diseases such as onchocerciasis and lymphatic filariasis is a challenge in many developing countries affecting about 16% percent of those living in the world (Kaiser Family Foundation, 2012). Madon et al (2014) reported the utilization of

mobile phones with internet in the collection of data at remote areas to help data reporting in Tanzania. Mobile phones were given to Village Health Workers (VHW) who assisted in data collection. Most of the VHWs reported that the use of the mobile phone has boosted their credibility and legitimacy among village works and has eliminated the carrying of papers.

mHealth strategies have also been deployed in the management of diseases in Africa. In Kenya, nurses have used mobile phones for weekly communications with HIV patients put on drug therapy to check how they are faring and then grouping their feedbacks according to their needs. This method of managing HIV via mobile phones improves patients' observance of routines regarding antiretroviral therapy and many other medical outcomes (Lester et al, 2011). Kenya is also evolving with one of the most astounding mHealth innovations in financial transactions for healthcare delivery. This has been engineered through partnerships with Safaricom, CarePay and PharmAccess Foundation. This initiative locally called M-Tiba, focuses on reducing catastrophic healthcare expenditures through out-of-pocket payments. It involves subscribers saving on a dedicated health wallet for the purpose of paying for health services. It targets people who are in hopeless situation, as they can't pay for private health insurance, and free clinics often provide inadequate services or are overcrowded (Biztech Africa, 2015).

The unique attribute about this strategy is the ability to connect demand and supply streams of healthcare delivery. Patients are not only able to pay through digital means but suppliers are also able to receive payments by virtue of a virtual till which suppliers can also use to pay for drugs and other consumables. On the demand side, development partners can channel money directly into the mobile wallets of extreme poor subscribers for treatment of specific diseases such as tuberculosis, malaria and for attending antenatal care. The Kenyan example is touted as an innovative model for healthcare financing.

After a study in a Zimbabwean hospital, the increasing use of mobile internet for medical research was identified with areas of research being management of diseases and side effects of medicines (Marufu & Maboe, 2017). Other mHealth uses identified were appointment reminders, support for the chronically ill and remote consultation (telemedicine).

The power of the mobile phone technology was harnessed by using it as a means to relate health information and to support current prevention campaigns in Uganda. Uganda is among countries in Africa with high HIV prevalence. In Mbara area of the western region of Uganda, through partnerships between the Dutch Ministry of Foreign Affairs, a mobile telecommunications company Celtell and a local NGO Aids Information Centre, 15,000 mobile subscribers were targeted through an interactive SMS quiz. Participants were to answer multiple choice questions on HIV. Winners were awarded free airtime which they could convert to cash. They are then directed to a place for voluntary counselling and testing at the end of the quiz.

Despite these mHealth initiatives, Africa still need to do more in channeling some resources into the development and testing of solutions to help strengthen the health system and to lower costs of health delivery. Some of the challenges hampering the growth and acceptance of mHealth are inadequate health literacy, cultural and language barrier, lack of skilled medical staff, lack of infrastructure, and cost barriers as noted by (Latif et al, 2017).

2.3. Mobile payments revolution and adoption

Mobile payments can be defined as any type activity that involves an electronic gadget with a connection to a mobile network which enables the effective completion of business transaction (Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva 2014). Dahlberg, Guo, & Ondrus (2008) also defined mobile payments as “payment for goods, services and bills

with a mobile device by taking advantage of wireless and other communication technologies" (p.165). It is a transaction process that involves the buying, payment or transference of value via a mobile gadget without cash or the help of finance organizations (Bitner, 2001, Dahlberg et al; 2008, Diniz, Albuquerque & Cernev 2011; Overbr 2014; Zhong 2009). Mobile gadgets such as phones provide a means by which financial transactions are made (Karnouskos & Fokus 2004).

The iteration of mobile payment research was given a boost once the very first mobile payment transaction was completed in 1997 when Coca Cola tested the market with a vending machine with the capacity to accept SMS payments (Dahlberg et al, 2008). Mobile payments have become one of the most innovative sectors in business with several blue-chip organizations such as Apple, Samsung, Google and Facebook entering the payment space and edging out earlier entrants such as Paypal.

One of the compelling reasons explaining the pace of innovations in the payments sector is revenue from transaction fees (Hedman & Henningsson, 2015). According to McKinsey (2014), annual payments revenues from mobile payment companies will reach $2.3 trillion in 2018. Even though payment fees are gradually declining per transaction, the sector has seen a lot of entrants lately leading to competitions and collaborations among stakeholders (Hedman & Henningsson, 2015). Dahlberg et al (2008) argued that in discussing mobile payment systems, it is essential to take cognizance of the underlying technology so as to classify payment systems into two categories. According to Slade, Williams & Dwivedi (2013), mobile payments can be classified into remote and proximity mobile payments. Remote mobile payments is the use of mobile phones to pay for transactions through short message service (SMS) or mobile internet connection while proximity concerns the use of near-field communication (NFC), quick response (QR) codes, or Bluetooth in aiding transactions.

Remote mobile payments have higher adoption rates compared to proximity mobile payments (de Kerviler, Demoulin & Zidda, 2016).

In Ghana, the mobile payments market is dominated by telecom operators and payment aggregators or financial technology (Fintech) companies such as SlydePay, ExpressPay, ZeePay and InterPay and some banks. Ghana witnessed its first mobile money transaction in 2009 when it was introduced by Ghana's leading telecom operator MTN. Mobile money has seen a phenomenal and exponential increase in adoption and transactions since its introduction. About 40% of Ghana's adult population currently use mobile money (GSMA, 2017). Mobile money has become synonymous to mobile payments in most developing countries. At the end of 2008, M-pesa in Kenya which was introduced by Safaricom made headlines for being the first mobile money service to cross the 1 million active subscriber mark. GSMA (2017) noted that the aggregate of all mobile money account holders is the third largest country in the world.

Mobile money was mainly used for peer-to-peer transactions and mobile airtime top up during its introduction. Over time the service has permeated other areas such as bill payments, bulk disbursements, international remittances and merchant payments. In 2011, global peer-to-peer transactions accounted for about 81.7% of all mobile money transactions by value while accounting for 30.7% by volume (GSMA, 2017) . The value and volume of peer-to-peer transactions are reducing as other forms of transactions pick up. In 2016, peer-to-peer fell to 68.7% and 19.9% by value and volume respectively (GSMA, 2017).

The biggest adulation in honor of mobile money is the fact that it has ensured financial inclusion and it is also touted as a potent tool to mitigate endemic poverty especially among marginalized groups. Mobile money is now available in two-thirds of low to middle income countries with Sub Saharan Africa leading in terms of new accounts.

Mobile money uptake has given impetus to the financial inclusion drives of international organizations such as the Bill & Melinda Gates Foundation, World Bank and the International Finance Corporation. The birth and launch of Alliance for Financial Inclusion (AFI) towards the end of 2009 in Nairobi Kenya catalyzed this drive. In 2015, $200 million in aid was targeted at the digital finance ecosystem with about $130 million going to mobile money operators. Several other organizations like the Better than Cash Alliance, United Nations Capital Development Fund's Mobile Money for the Poor program, Bankable Frontier Associates, Financial Sector Deepening Trusts and MicroSave are propelling the financial inclusion agenda while the academic community is providing research evidence on how mobile money impacts on the lives of the underserved.

Mobile money has contributed in reducing poverty and increasing the financial resilience of rural households. According to Munyegera and Matsumoto (2014) the per capita consumption of rural households increased by 72% after the adoption of mobile money in Uganda. This was because they were able to receive remittances in higher amounts, more often, and from more people than rural households that did not adopt mobile money.

Improved financial resilience means better health outcomes for rural households. Mobile money has been used to improve the efficiency of healthcare delivery in diverse ways such as disbursement of salary payments or incentive payments for health workers, receipt of health insurance premium payments, enabling people to save for future health costs through dedicated health savings wallets, and many more.

The mobile payments market displays characteristics that differentiates it from other digital markets. This characteristics is the high regulatory framework that exists in the industry (Ferguson, 2009). In Ghana, the mobile money market is regulated by the Bank of Ghana and the National Communications Authority. These ensures promotion of competitive practices

and the protection of customers' data. di Castri (2013) reported the role of regulatory bodies in the adoption of mobile money in an assertion that 12 out of the 14 fastest growing mobile money services were in markets with enabling regulatory systems. Evans & Pirchio (2015) also noted that that rigid regulation, particularly restrictions on the role of non-banks, excessive know-your-customer (KYC) requirements are particularly fatal to the growth of mobile money services.

In Ghana as in other markets, there is an increasing focus on interoperability between mobile money operators on one hand and mobile money to bank account on the other hand. Many banks in Ghana have already linked customers' accounts to their mobile money wallets and allowing mobile money users to transact business directly from their bank accounts. Mobile money account-to-account interoperability is yet to take off in Ghana even though it has gone live in 15 markets (GSMA 2017). Interoperability will further increase the diversity of use cases for mobile money and also increase access to other sources of funds for mobile money users.

2.4. Healthcare Financing

2.4.1. Healthcare financing models

A healthcare financing system can be described as a market made up of players on the demand side (patients) and supply side (providers) who relate with payers and purchasers of healthcare and are being regulated by governance institutions and professional bodies. The most important thing that ensures smooth operation of this market is financial transactions. Patients need to pay for services provided, providers need money to purchase drugs and consumables and governance institutions need money to provide structures and vaccines etc. How healthcare is financed is one of the most important foundations of every country's healthcare system. It is a defining factor in the achievement of health system objectives. The healthcare financing system essentially revolves around three agents who are interconnected

through various processes and transactions but they all look up to regulating authorities for streamlining of their activities.

Relationships between these agents are depicted in figure 1 below.

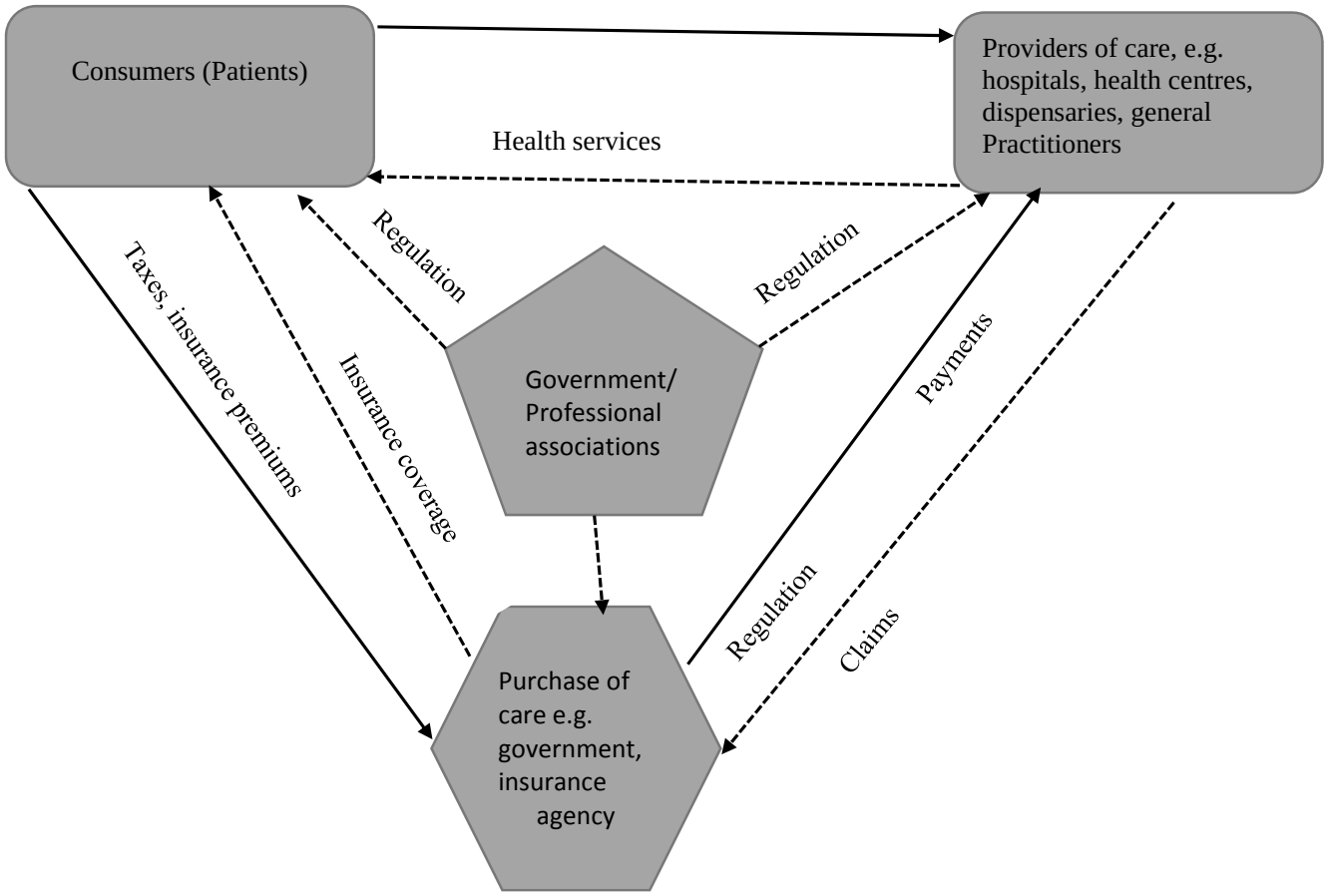

Figure 2. Agents in Health financing. Source: Kirijia et al. 2006

Healthcare financing is described as a function of a health system responsible for the management of funds to cover the health needs of participants of the health system. Its purpose is to ensure the readiness of funds for healthcare, put in place measures to incentivize providers, to ensure that everyone has uninterrupted access to quality care (WHO, 2010). A country's healthcare financing system normally reflects its health systems objectives, culture and healthcare politics. A healthcare financing system defines the payers for healthcare, the

quantum of payment and the mode of payment (Kutzin 2008; Moore, Anthony, Lim & Jones, 2014).

Health financing systems are often times categorized into three models primarily based on the source of funds (Kutzin, 2008). These are the Bismarckian, Beveridgian and Semashko models. The characteristics of the models are depicted in table 2.

Table 2. Health financing models. Source: Researcher

The Bismarckian Model	The Beveridgian Model	The Semashko Model
• Private health plans • Financed by employers and employees • Private providers and payers • Non profit making • Cost control and strict regulation	• Healthcare is financed through tax • Healthcare provided by government • There are no medical bills • Cost control	• Centralized, integrated hierarchically organized • Government funds healthcare • All healthcare personnel are state employees. • Focus placed on primary and specialist healthcare

Moore et al (2014), noted that there are differences in how countries finance their healthcare but five financing systems can be identified. They classified financing systems into national health insurance, government budget allocations, private health insurance, social health insurance and private pay. Characteristics of the five financing systems are explained in table 3.

Table 3. Health financing systems. Source: Adapted from Moore et al; (2014)

Out-of-pocket	•**Main revenue type**: Personal •**Pooling**: None •**Purchasing**: Individual
Public Budget	•**Main revenue type**: Public budgets •**Pooling**: government •**Purchasing**: by government
Private Health Insurance	•**Main revenue type**: Individual and employer payments •**Pooling**: Privately managed pools •**Purchasing**: Selective contracts
Social Health Insurance	•**Main revenue type**: Payroll tax, government budget •**Pooling**: Pools by job or income •**Purchasing**: Collective and selective contracts
National Health Service	•**Main revenue type**: General taxes •**Pooling**: National pool •**Purchasing**: National or regional direct purchase

Some countries combine various financing models and systems but drives ultimately towards ensuring universal health coverage for its populations. Ghana combines the Bismarckian, Beveridgian model with a graduated informal premium payment (based on ability to pay) for its National Health Insurance System (NHIS). Moore et al (2014) proposed five financing issues which must be considered in healthcare financing. These are:

i. Eligibility: Refers to who has the right to access care that is provided by the public or private sector. Most countries have defined access to primary care as a human and constitutional right (Kutzin, 2011; Moore et al, 2014).

ii. Benefits package: This refers to the various services or disease conditions and treatments that are covered under the health plan. The benefits package will determine the level of financial resources to fund what is covered. Ghana has a very generous

benefits package which covers about 95% of all disease burdens in Ghana (Agyepong & Adjei 2008; Dalinjong & Laar, 2012).

iii. Sources of funds: This is a key function in healthcare financing and it refers to the kind of resources needed to fund the system and how to get the resources. Key issues to consider are whether funds are adequate, whether funds are raised in an equitable way and whether the poor and vulnerable are protected from financial risks. Financial protection during times of ill health means that people should not drift into poverty as paying for healthcare nor should they be pushed to choose between their health and their economic welfare. Of particular concern to policy makers is the degree to which households become economically worse off due to health expenses, or on the other hand, the robustness of the healthcare financing system in shielding people from the danger of moving into poverty, while increasing people's ability to make use of healthcare services.

Sources of funds for healthcare financing may vary depending on the system and the level of a country's development (Moore et al, 2014). Funding sources may be from corporate sources, public and private in different forms. Most developing countries have a large chunk of their health budget from corporations, philanthropist and international aid generally referred to as development assistance for health (DAH) (The Lancet, 2014).

iv. Pooling of funds: One of the core principles of a health plan is to pool funds in order to spread risks among contributors. This is to prevent catastrophic health expenditures in times of ill health. Funds are normally collected and placed in a pool and distributed according to peoples need for healthcare.

v. Purchasing: This is about the "the transfer of pooled funds to providers on behalf of a population" (Kutzin, 2008, p.11). This can be done passively or strategically. In

passive purchasing, bills are paid by purchasers when presented by providers or a predetermined budget is adhered to in purchasing. Strategic purchasing requires an endless search for the best options to improve output in the health system by choosing which services to purchase, how to purchase them, and from which providers (Kirigia, Preker, Carrin, & Mwikisa, 2006; Moore et al, 2014). The method chosen in provider payment constitute an important part of the purchasing negotiation. Some of the provider payment methods used in Ghana National Health Insurance Scheme are:

- Diagnosis Related Grouping (DRG) – Where payment is made according to the diagnosis irrespective of the cost of care to the facility that provides the care.
- Capitation – Where a fixed amount is paid providers for a predetermined time to cater for outpatient, physician services and medicines. Capitation was introduced on pilot basis on January 2012 in the Ashanti Region. The capitation policy was introduced to streamline what the NHIS called alleged excesses and abuse of the scheme by service providers (Akiweley & Nangebeviel, 2017).
- Fee for service – Where payment is done for each service or procedure after it is performed.

2.4.2. Crowdfunding healthcare

Crowdfunding is an emerging and innovative method of health financing that deviates from traditional financing methods. Crowdfunding is the process of financing a project or enterprise by raising little amounts of money from many people, typically via the Internet (Prive, 2012). Crowdfunding is becoming the mainstay of finance for many health related campaigns (The Lancet Oncology, 2017; Moran, 2017, Young & Scheinberg, 2017).

Crowdfunding transactions typically takes place with the involvement of three players. The initiators of the project who are seeking funding, the funders of the project and the platform that links/connects the project initiator with the funders (Kuti, 2014). The initiator of the crowdfunding may act as an agent for an individual or groups and does not always benefit from the project. There are three models that characterize crowdfunding: Donation-based, reward-based and investment based. Donation-based crowdfunding is where participants offer philanthropic contributions towards a cause (Belleflamme, Omrani, & Peitz, 2015). Reward-based crowdfunding asks funders to contribute money in return for rewards or prizes (Belleflamme et al, 2015). Investment-based crowdfunding is the type where participants provide funding through high interest loans or in return for a stake in a company (Belleflamme et al, 2015).

There are about 1,250 crowdfunding platforms in the world raising a total of $16.2 billion in 2014 alone (Massolution, 2015). Some of the most notable crowdfunding platforms in the world include Indiegogo, Crowdcube, HealthConnect and GoFundMe etc. The most important factor accounting for the rise of crowdfunding is the commercialization of the internet (Agrawal, Catalini, & Goldfarb, 2014). Internet commercialization has reduced transaction costs and provided an effective way of matching funders and project initiators.

Crowdfunding healthcare however cannot be limited to the use of just the internet but mobile technology and the extensive use of both new and conventional media. In the absence of the internet, conventional media such as radio or television has proven very effective in croudfunding individual healthcare and other healthcare initiatives. In a health campaign dubbed #SaveThemNow, the First Lady of the Republic of Ghana and the MultiMedia group raised GHS 7.7 million towards the building of a new mother and baby centre at the Komfo Anokye Teaching Hospital, the largest hospital in the Ashanti region (MultiMedia, 2017b).

The MultiMedia group provided the crowdfunding platform that connected funders which included corporate bodies and individuals to the initiator which was the First Lady.

One of the tools that is commonly used in crowdfunding for individual healthcare expenditures is mobile technology. The media landscape is replete with stories of individuals in need of funds for healthcare. The media normally provides the platform and connects individuals who contribute their widow's mite through mobile money and other methods towards funding the healthcare of stranded individuals. MultiMedia (2016), reported crowdfunding the cost of surgery for a brain tumor patient. In a similar fashion, through the use of mobile wallets, individuals and families in Kenya are able to receive funding for their healthcare through contributions from individuals and corporate organizations in Amsterdam. This is made possible by HealthConnect, a crowdfunding platform that connects people, companies and organizations that want to make a difference with projects that have a positive impact on the health of people in Africa. This is done with an open digital platform, with which they connect people directly to better healthcare. HealthConnect offers fundraising organizations the opportunity to recruit new supporters with direct donations (Pharmaccess, 2017).

Renwick & Mossialos (2017), proposed a typology for crowdfunding health projects and classified crowdfunding for health into four types. The first they termed health expenses; which are campaigns to raise donations to fund out-of-pocket expenses for patients unable to afford certain medical procedures or products (Sisler, 2012). The second type of crowdfunding is geared towards not-for-profit health initiatives such as fund raising for medical institutions or charitable organizations, patient education and awareness programs and global health missions (Renwick & Mossialos, 2017). An example is the 2014 ice bucket challenge which raised a total of $115 million towards amyotrophic lateral sclerosis association and motor neuron disease association (Chakradhar, 2015).

The third is health research where health researchers crowdfund contributions for not-for-profit research work (Cameron, 2013; Kaplan, 2013; Vachelard, Gambarra-Soares, Augustini, Riul & Maracaja-Coutinho, 2016). The fourth type is equity crowdfunding where healthcare ventures with commercial future is crowdfunded with equity. Money from equity crowdfunding may be used to speed up clinical testing and development of new therapies or increase the production of a medical product (Renwick & Mossialos, 2017).

Crowdfunding draws attention to neglected health issues and populations and improves individual and health startups access to financial support. Health system policy makers should however take note that high health related crowdfunding signals a gap in the healthcare financing system. High crowdfunding for health expenses is a sign of inadequate insurance or universal health coverage for populations.

2.5. Theoretical framework and hypotheses

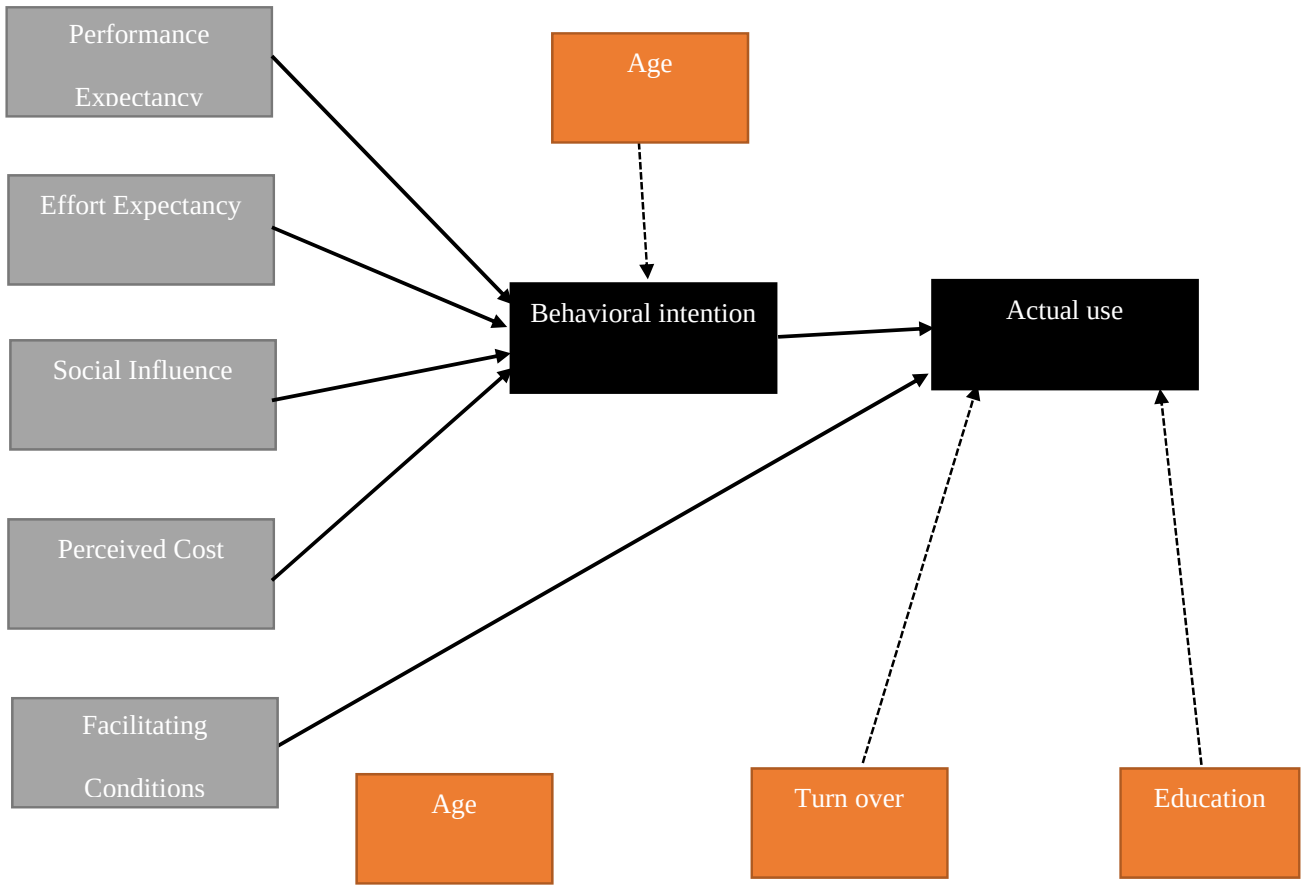

Figure 3. Adapted Unified Theory of Acceptance and Use of Technology Source. Venkatesh et al; (2003)

Studies into understanding the acceptance and use of technology has been dominated by the Technology Acceptance Model (TAM). In recent times, the Unified Theory of Acceptance and Use of Technology (UTAUT) has been used by some researchers. The UTAUT was developed by Venkatesh, Morris, Davis, & Davis in 2003 to provide a standardized theory for technology acceptance research. It was developed as a result of the many criticism that characterized the various theories for technology acceptance research. Venkatesh et al (2003) developed the UTAUT through a fusion of eight different technology research theories.

The theory was criticized for failing to fully capture the specific task environments under which research is being done. Most researchers focus on the core model by removing the moderators in using the theory (Lian, 2015; Pascual-Miguel et al, 2015). Other researchers augmented the theory by introducing additional moderators (Baptista & Oliveira 2015; Lian, 2015). In order to capture and understand the peculiarities of the healthcare provider environment, a related approach was used in this study by introducing two new moderating variables of patient turnover and educational level (actual use) in addition to one moderating variable of age (behavioural intention) to the original theory.

Research has produced a collection of conflicting models all with a set of different determinants to predict the acceptance and use of technology. Prominent among these models were the Innovation Diffusion Theory (IDT), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), the Social Cognitive Theory (SCT), the Model of PC Usage (MPCU) and a

combination of the Technology Acceptance Model and the Theory of Planned Behavior (C-TAM-TPB).

In a bid to ensure uniformity of these theories, Venkatesh, Morris, Davis, & Davis, (2003) synthesized these eight different models which culminated in the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT model consists of six key constructs of effort expectancy, performance expectancy, facilitating conditions, social influence, behavioral intentions to use technology and usage behavior (Oshlyansky, Cairns & Thimbleby, 2007; Venkatesh, et al, 2003). Venkatesh et al (2003) found that four constructs are proximate determinants of user acceptance and actual use of technology. These were performance expectancy, effort expectancy, social influence and facilitating conditions. A fifth construct (perceived cost) was added because of the nature of the study.

2.5.1. Performance expectancy

Performance expectancy is defined as the degree to which people think that using a system will help them to realize improvements in job performance (Venkatesh et al, 2003). Performance expectancy revolves around attributes inherent in the system that facilitates the completion of tasks such as speed, efficiency and accuracy in task completion which sets apart the system from competing ones (Yang, 2009). Performance expectancy aligns with some of the constructs from which UTAUT was drawn which are extrinsic motivation from MM, outcome expectations from SCT, perceived usefulness from TAM and C-TAM-TPB, job fit from MPCU and relative advantage from IDT.

Performance expectancy was found to be the strongest predictor of adoption intentions (Venkatesh et al 2003; Baptista & Oliveira, 2015). Performance expectancy has an association with people's intention to use mobile devices (Venkatesh, et al 2003; Carlsson,

2006). Performance expectancy has also been demonstrated to have a direct association with the adoption of mobile health services. The greater the performance expectancy, the more likely people are to use mobile health services (Sun, Wang & Guo, 2013). Healthcare providers who perceive mobile payment systems as fit for their purpose and have the ability to improve their care delivery are more likely to accept it compared to those who do not.

H1. Performance expectancy is associated with the behavioural intention to use mobile payment systems by healthcare providers.

2.5.2. Effort Expectancy

Effort expectancy is defined as the measure of how easy it is to use a system (Venkatesh et al., 2003). It is the individual's assessment of the strength required to complete a task using a particular system. The concept of effort expectancy has been likened to three constructs of existing models which were synthesized. Several authors also asserted the similarities between the effort expectancy and other constructs (Davis, 1989; Moore and Benbasat, 1996; Thompson, Higgins, and Howell, 1991).

Effort expectancy is likened to complexity (MPCU), ease of use (IDT) and perceived ease of use (TAM). Effort expectancy has been identified as a proximate factor which influences user's intention to use health technology (Sun et al 2013; Boontarig, Chutimaskul, & Chongsuphajaisiddhi, 2012). Some studies found non-significant relationships between effort expectancy and intention to use technology ((Baptista & Oliveira, 2015; Lian, 2015). Recent studies by other authors found positive relationships of rather low degrees (Pascual-Miguel et al, 2015). Venkatesh, and Morris (2000) drawing on knowledge from studies by other authors theorized that performance expectancy is more essential to women than men in terms accepting and using technology. The following hypotheses is thus developed.

H2: There is a strong association between effort expectancy and the intention to accept mobile payment system in healthcare delivery.

2.5.3. Social influence

Social influence is the extent to which someone thinks that people who are important to them believe he or she should use a new system (Venkatesh et al, 2003). Social influence has been identified in earlier theories as subjective norm (TRA, TPB, C-TAM-TPB), image (IDT) and social factors (MPCU). In a research on understanding the acceptance of mobile health services, Sun et al (2013) found that social influence affects the behavioral intention to use mobile health services. Lu & Yao (2005) also reported that social influence has a strong impact on user's intention to adopt technology. Wills & El-Gayar (2008) also noted significant correlation between social influence and intention to use digital information in healthcare. Theory is in support of the fact that women are more sensitive to people's opinions and will therefore find social influence to be useful in deciding whether to use technology compared to men (Miller, 1976; Venkatesh and Morris, 2000).

In light of the above, it is hypothesized that:

H3: Social influence has a weak association with healthcare providers' behavioural intention to adopt mobile payment systems.

2.5.4. Facilitating conditions

Facilitating conditions is defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh et al 2003). Facilitating conditions is also described as the availability of resources to facilitate the performance of a task (Taylor & Todd, 1995; Taylor, 2016). This construct captures ideas in other models such as compatibility (IDT), facilitating conditions (MPCU) and behavioral

control (C-TAM-TPB, TPB). Facilitating conditions has a strong positive association with actual use of technology but no effect on behavioral intentions (Venkatesh et al, 2003). Boontarig et al (2012) found in their study that facilitating conditions positively influences behavioral intention and use behavior in terms of smartphones for health services. Infrastructure support was also found to play a major role in the use of health information systems (Bhattacherjee, 2008)

H4: Facilitating conditions will have a strong association with actual use of mobile payment systems in healthcare delivery.

2.5.5. Perceived cost

This refers to the cost of acquiring and operating the technology. For users of mobile payments systems, this refers to the purchase of phones, data subscription, communication and transaction costs that are incurred in using the system. Other costs relate to alternatives forgone in taking mobile payments decisions and the cost of establishing relationships with purveyors of the system.

H5: Perceived cost will have a significant relationship with the intention to adopt mobile payment system.

2.5.6. Behavioral intentions and use behavior

Intentions to perform an action results from conscious decision making (Davis, 1989). Some authors have used behavioral intentions as the main dependent construct and as a proxy for actual use of technology (Morosan & DeFranco, 2016). Others have however separated them as two dependent variables with behavioral intentions as a predictor of actual use. Venkatesh et al (2003) empirically tested the relationship between behavioral intention and actual use of technology and found that they are positively related in that, behavioral intention predicts

actual use of technology. Kijsanayotin & Pannarunothai (2009) also found out that behavioural intention is a predictor of actual use of health information technology.

H6: Behavioral intentions will have a significant association with actual use.

H7: Actual use will be moderated by age such that the effect will be significant for older owners of health facilities.

H8: Actual use will be moderated by patient turnover such that the effect will be significant for health facilities with higher patient attendance

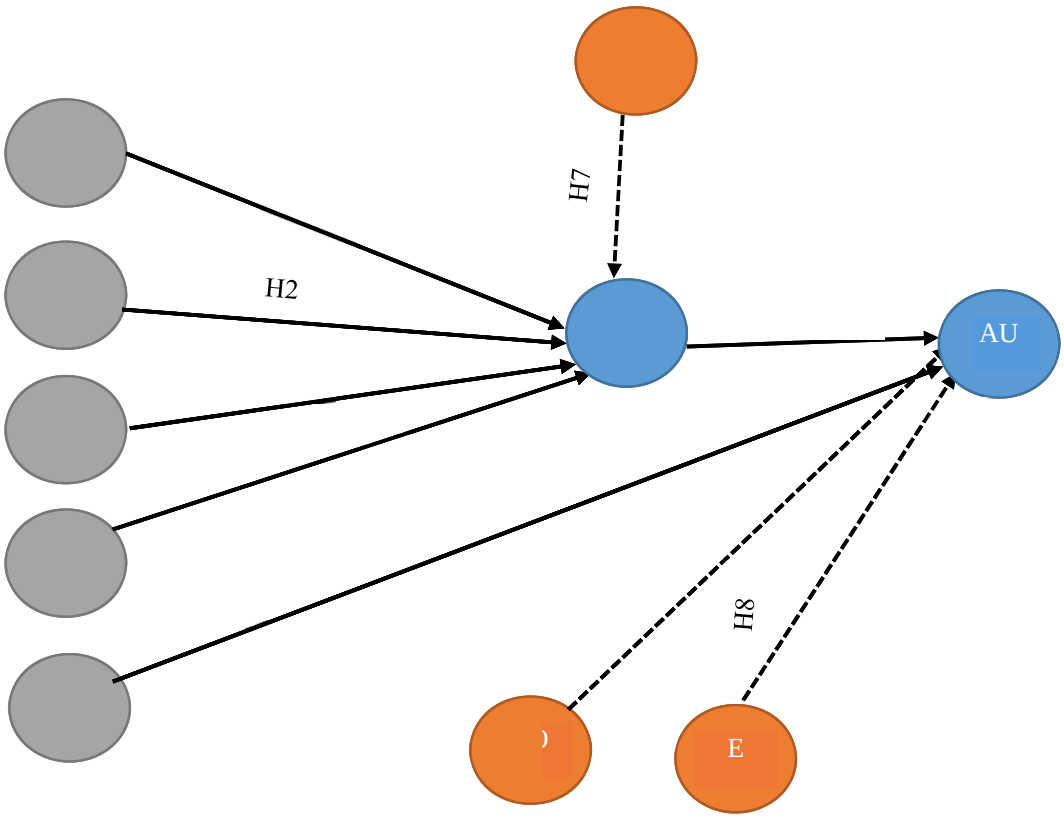

Figure 4. Summary of theoretical model and hypotheses

CHAPTER THREE

METHODS

3.1. Study design

The study was a cross-sectional quantitative study. Data were collected over a six week period.

3.2. Study area

The study area was the Ayawaso Municipality of the Accra Metropolitan Area. The study area is part of the ten sub metros that constitute the Accra Metropolitan Assembly. It has just been elevated to a municipality. It houses communities or suburbs such as Dzorwulu, Abelemkpe, Tesano, East Legon, Legon, Airport West, Airport Residential Area and Westlands, Newtown, Nima, Alajo, Tesano and Kanda. The study area is also replete with some of the notable private healthcare providers in Ghana. The area has a mix of people with different socio economic status (from upper income and lower income dwellers, people of very high and low educational backgrounds).

3.3. Study population

The study population was private healthcare facilities. Owners, administrators and managers of the private facilities were interviewed.

3.4. Study variables

Table 4. Study variables

Variable	**Type of variable**	**Definition**	**Measurement scale**
Use behavior	Dependent	Actual use of payment solution at the time of study	Binary Yes No
Behavioral intention	Dependent	Intention of effective use of mHealth payment systems by facility owners.	Nominal Likert scale
Performance expectancy	Independent	The degree to which owners of health facilities believe that using mHealth payment systems will help achieve task performance.	Nominal Likert scale
Effort expectancy	Independent	The degree of ease associated with the use of mHealth payment systems	Nominal Likert scale
Social influence	Independent	The degree to which owners of facilities perceive that others have influence on their use of mHealth payment systems	Nominal Likert scale
Facilitating conditions	Independent	The degree to which owners believe that organizational and technical infrastructure exists to support the use of mHealth payment systems	Nominal Likert scale
Perceived cost		Costs associated with acceptance and use of mobile payments	Nominal Likert scale
Patient turnover	Independent	Total number of patients seen by provider	Continuous
Education	Independent	Refers to the highest educational level attained by the owner of the healthcare facility.	Ordinal

3.5. Sample size and sampling method

The list of registered medical facilities within the study area was obtained from the Ghana Health Service. A census was carried out on all facilities in the study setting with 110 possible respondents.

3.6. Inclusion and exclusion criteria

Inclusion criteria for the study was all duly registered private health facilities providing healthcare within the study area and are recognized by either the Health Facilities Regulatory Agency, the Pharmacy Council and have a valid business registration certificate. Types of healthcare providers included were clinics, laboratories, pharmacies and hospitals. Participants showed their willingness to take part in the study by completing a consent form. Exclusion criteria for the study includes all healthcare providers who are duly licensed or registered but fall under herbal providers or traditional medicine practitioners.

3.7. Data collection technique/tools

Data was collected from study participants using a structured and pre-coded questionnaire. Data collection lasted 45 minutes for each facility. Key components of the data collection instruments were demographic characteristics of facility owner or manager, facility characteristics and a section on dependent and independent variables.

3.8. Data processing and analysis

The questionnaires were entered into Microsoft excel. The data was cleaned and exported into Statistical Package for Social Sciences (SPSS) SPSS version 22 and analyzed using tables and frequency distributions. The main constructs of the study were analyzed using

structural equation modelling (Confirmatory factor analysis and Path analysis) tool – via the AMOS software package. It is capable of assessing the psychometric attributes of the measurement model and also useful in predicting the parameters of the structural equation model. The modelling tool enabled the analysis of many predictor variables simultaneously while making it possible for examining the interactions between moderating and predicting variables in the study. SEM was also used to test the hypothesized relationships between the constructs.

3.9. Quality control

The principal investigator was assisted by research assistants to collect data. They were trained on the theory, the questionnaire and the purpose of the study. Adequate financial motivation and transportation was provided for them. Daily checks were done on filled questionnaires and the data collection process was monitored to ensure the quality of the data. Data was entered twice to check data entry errors.

3.10. Pre-testing of data collection instrument

The questionnaires were pretested at 5 private healthcare facilities which were outside the study area (Dome, Achimota, Madina, Adenta and Lapaz). This was to check whether the questions were properly framed for the understanding of participants. Some questions were reframed to ensure better understanding prior to the actual data collection.

3.11. Ethical considerations

Permission for this study was sought from the Ethical Review Committee of the Ghana Health Service with the clearance number GHS-ERC: 024/02/18. Ethical issues such as consent,

voluntary withdrawal, benefits and confidentiality of the study were addressed sufficiently. Informed consent was obtained from all healthcare providers involved in the study.

CHAPTER FOUR

RESULTS

4.1. Demographic characteristics of facility decision makers

Responses were received from 109 healthcare providers within the study setting during data collection. The mean years in operation of facilities surveyed under the study was 13 years while the mean age of the owners, managers and administrators (decision makers) of these facilities was 35 years. Fifty-three percent (53%) of the facilities surveyed currently use mobile payments at their facilities. Fifty-two percent of facility owners or managers are degree holders while 2% are PhD holders. Thirteen percent of managers have also acquired masters level education whiles 10% have senior high school education.

4.2. Behavioural intention

4.2.1. Reliability and validity of the constructs

Table 5 below shows convergent validity results for the model. The data in the table show that the reliability measures are robust. All the parameters are more than the suggested threshold value of 0.7 (Nunnally, 1978). Except social influence, all other constructs have high internal consistency reliability as indicated by the composite reliability (CR) values. In a similar manner, consistent with the guidelines proposed, the average variance extracted (AVE) for each parameter except social influence are above the suggested threshold of 0.5 as indicated in table 5 (Fornell and Larcker,1981).

Table 5. Convergent validity results

Parameter	Composite reliability	Average variance extracted/explained
Perceived cost	0.957	0.819
Performance expectancy	0.850	0.536
Effort expectancy	0.765	0.504
Social influence	0.597	0.369

Convergent validity was also tested by extracting the factor loadings of all the parameters and their respective latent constructs. The results are presented in table 6.

Table 6. Factor loadings for the constructs

	Performance Expectancy	Effort Expectancy	Social Influence	Perceived Cost
PE1	0.81	-	-	-
PE2	0.70	-	-	-
PE3	0.84	-	-	-
PE4	0.74	-	-	-
EE1	-	0.75	-	-
EE2	-	0.89	-	-
EE3	-	0.81	-	-
SI1	-	-	0.82	-
SI2	-	-	0.64	-
SI4	-	-	0.72	-
PC1	-	-	-	0.98
PC2	-	-	-	0.93
PC3	-	-	-	0.95
PC4	-	-	-	0.99

Table 6 and figure 4 shows that the factor loadings through their highly significant T-statistic values that, each individual item loading affirms the convergent validity of the indicators as capturing its distinct construct.

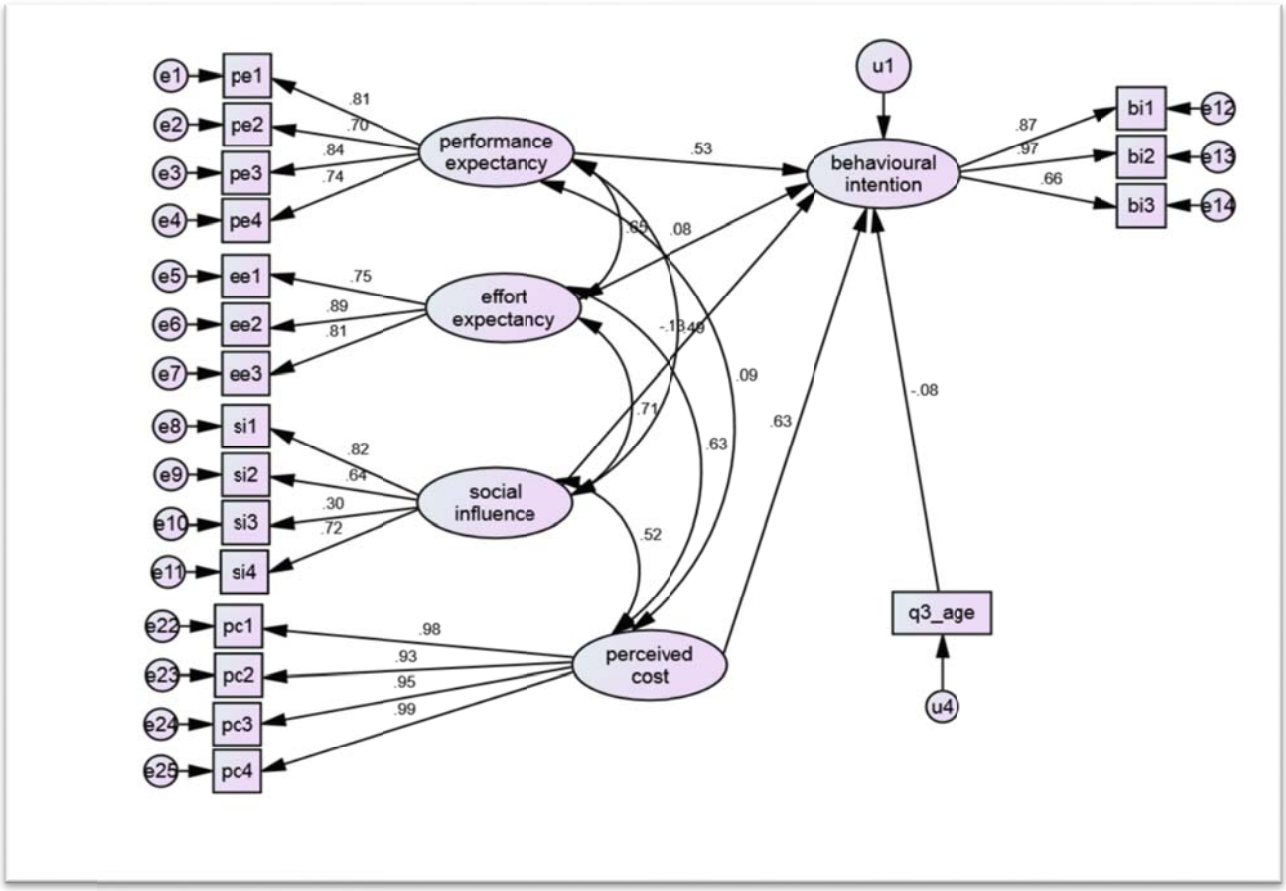

Figure 5. Model with only Behavioral Intention as the dependent variable (standardized regression model estimates – factor loadings).

From the results as presented in figure 4, it has been found that performance expectancy is associated with the intention to use mobile payments in health delivery. Performance expectancy increases the intention to use mobile payments by 0.53 ($p<0.001$) which is statistically significant. Results for effort expectancy and social influence were however found not to be relevant statistically hence they do not play any role in the intention to use mobile payments in health delivery. Perceived cost was also found to contribute 0.035, ($p<0.001$) in statistically significant proportions in determining providers' intention to use mobile payments. Age as a moderator was also found to have no significant effect on the intention to use mobile payments.