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The significance of interoperability in the mobile payment industry in Ghana: the theoretical, practical and policy perspectives.

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### ABSTRACT

Mobile payment is a strongly emerging payment method in Ghana, notwithstanding that, it has brought an interoperability issues among the competing firms which has drawn the attention of present government and various stakeholders of Ghana. This study seeks to identify the recent major methodological changes that have taken place in line with the current ongoing debate on mobile payment interoperability.

Methodologically, this study employs secondary data from the internet for the analysis. The first steps seek to explain interoperability as a new concept in the mobile payment companies. The second involves explaining the theoretical premises of the interoperability phases and the third involves the practical and policy implications upon which they are made and the future security issues.

The study uses secondary data from daily graphic, internet and archival sources. The study follows mixed method, both quantitative and qualitative approach. Statistical tools such as tables and charts and diagrams are used to present the data to indicate their relationships. The findings revealed that even without interoperability in place, Ghana has lost about 25million dollars in 2016 increasing to some 69 million dollars in 2017 and 97 million dollars as at August of 2018 .This called for key stakeholders, such as central banks ,Cyber security centre and strong regulatory framework to be established for the nation. Based on the expected outcome of the findings, the study offers useful recommendations for scholars and practitioners and their implication for further research and managements of mobile payment companies in Ghana.

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Keywords: Interoperability, emerging, implication, policy makers

## **1.0 INTRODUCTION.**

### **1.1 Research Backgrounds**

Mobile payment in Ghana has existed for few years but has driven the interest of many customers due to the fact that it facilitate financial transactions and reduces the burden of joining a long queue at the commercial banks. Even though mobile payment has proved to be successful in Ghana, it has faced interoperability issues. This is because mobile payment operators can only send money to customers belonging to the network of the same firm. In other words, a customer in the Vodaphone network cannot send money to a customer belonging to Mobile Telephone Network (MTN). Similarly, a customer in a Glo network cannot receive or send money to a customer on Airtel/Tigo mobile payment providers network. The financial transactions between customers therefore become very difficult and limited as customers are not allowed to transact financial transactions freely among themselves but always have to belong to a particular network of their choice to make payment possible. This affect provision of excellent customer service from the perspectives of the competing firms as it does not encourage financial inclusion and healthy competition in Ghanaian environment as far as mobile payment industry is concerned.

### **1.2 Statement of the problem**

Although mobile payment is an emerging method in Ghana, there are lot of interoperability problems encountered by the agents, companies and the customers in their financial transactions which the previous researches failed to address. The first problem is that individuals firms cannot transfer funds between competing firms. Customers in one competing firm cannot send or receive funds from another customer in another competing firm. Secondary, there is a problem with the interface with Ghana link which made it possible for Central bank to properly supervise the transfers of competing firms. Thirdly, mobile agents and merchants cannot transfer funds from one wallet to another merchant's wallet in another competing firm. These challenges have limited the operations of the mobile payment firms'. Even though these problems might have received attention of researchers in the western world; it has not received much critical attention from researchers in Ghana. This has created a vacuum of knowledge about how these challenges can be remedied in Ghana mobile payment companies. This study seeks to fill this research gap by providing the recent major changes in terms of interoperability issues in Ghana. There have been recent and rampant attempts by various stakeholders on the operations of the mobile companies and this has sounded a caution to both the companies, agents and potential customers on the need to collaborate with the present government to work together to remove this barriers to fill this gap. The purpose of this study is to highlight the resulting benefits that can occur as a result of the role interoperability. In the nutshell, the purpose of this study is to assess the theoretical significance of interoperability in the mobile payment companies, the practical and the regulation issues associated with them. The study seeks to relate it to mobile payment situation in Ghana.

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### **1.4 Research Objectives**

#### **1.4.1 General Objective**

The general objective of the study is to fill the gap in literature and contribute to the general body of knowledge and research work in the area of recent mobile payment interoperability by providing an empirical evaluation of the significance of the interoperability to mobile payment companies in Ghana to support financial inclusion.

#### **1.4.2 Specific Objectives**

In order to achieve the general objective of exploring the significance of mobile payment interoperability, specific objectives have been developed to drive the research. The study seeks to achieve the general objective through the accomplishment of the following specific objectives;

1. To examines the meanings of the levels and stages of interoperability.
2. To identify the theoretical benefits of interoperability to mobile payment industry in Ghana
3. To synthesize required policy changes for successful implementation of interoperability.

### **1.5 Research Questions**

The major questions that will be addressed in this study is: what are the stages of interoperability and their associated benefits and policy changes required for its successful implementation. In order to achieve the research objectives, this study adopts the approach used by Havrylchuk and Jurzyk (2006) by investigating research questions instead of research hypothesis. The specific

questions that will be addressed in order to achieve the research objectives include the following;

1. What are the meanings of the levels and stages of interoperability?
2. Are there theoretical benefits of interoperability to mobile payment industry in Ghana?
3. What are some of the policy changes required to implement interoperability?

### **1.6 Significance of the study**

The research will have theoretical, practice and policy implication. Theoretically, findings on Research will deal with examining the meaning of the levels of interoperability and the benefits to contribute to financial inclusion to provide further insight into the ongoing debate on mobile payment interoperability issues. In terms of practice, the findings on Research objective two deals with the benefits of interoperability will encourage organizational managers to play strategic role in ensuring the success of interoperability. It will also encourage healthy competitions among mobile payment companies and to bring out new innovations that will encourage competitive edge over each other.

### **1.7 Limitations and Delimitations**

#### **1.7.1 Limitations**

The major limitation of this study will have to be on data availability and accessibility. Research on interoperability are very limited. Information Therefore, information about them are not available to the public and accessibility. For effective generalization, this study will be more robust if data is collected from the entire population of mobile merchants. However, due to scarcity of resources (that is funds and time), it will make it impossible for the data to be collected on a very large sample. In addition, the secondary data that will be used for analysis may be affected by institutional biases and errors.

#### **1.7.2 Delimitations**

The study will be limited to Mobile payment companies. The study will not cover other financial institutions. This is because previous studies had covered the other financial institutions. In addition, the study review integrated models. The study does not examine the other demographic characteristics of mobile companies' merchants as it will not be very relevant to the present study. Also, the use of statistical tools, diagrams and charts are assumed to be the best method for analysis with little error.

## **2.0 LITERATURE REVIEW**

### **2.1 Introduction**

The concept of interoperability is whole new concept which the previous research did not give attention in the literature. Interoperability has become very important in the mobile payment industry because customers within the industry cannot transact financial transaction among themselves. According to them, what normally happens in the ideal situation is that, a customer in one network cannot transfer funds to another. Customer in a different network making financial transaction very difficult. (Mensah et al., 2003) have predicted that, globally, mobile payment transactions will increase to \$55 billion in 2008 and therefore interoperability issues must be tackled to smooth financial transaction and inclusions. The rest of the chapter is organized as follows; Section 2.1 discusses the empirical studies and Gaps in the literature. Sections 2.2 synthesises the current debate on interoperability. Section 2.3 discusses the theoretical problems with interoperability 2.4 discusses the limitations of past researches 2.5 and 2.6 discusses the key assumptions and boundary of the research.

### **2.1 Empirical studies and the establishment of Gaps**

The empirical literature used Technology Acceptance Model (TAM) to determine customer adoption of mobile payment. As an extension to the previous reviews using only Technology Acceptance Model (TAM), Pal, Vanijja and Papasratorn (2015) empirically proposed a research model that is a modified version of Technology Acceptance Model (MTAM). The main objective of their study is to identify the factors that are responsible for the adoption of mobile payment system by end users behavior. The modified version added two factors: Personal Innovativeness (PI) and Payment Knowledge (PK). Finally, using 270 questionnaires for empirical analysis the researchers found out that generally a person having a higher degree of Personal Innovativeness (PI) should have a positive effect on the Perceived Ease of Use (PEOU) of any new system, which in turn should lead to a positive system usage intention.

### **Gap in their research:**

Their research is limited by the fact that there are more factors that can affect customers use of mobile payment. Their research

only limited to customer adoption of mobile payment .The research did not predict mobile payment interoperability whereby customer adoption of one particular mobile payment company will be influenced by the fact that transfers can be made across different mobile payment network . This study aims to fill this gap in empirical literature by providing further evidence that interoperability which was not considered by previous researchers can service a motivating factor to customer adoption of one or more mobile network.

Chen and Nath(2008) also utilize empirical data to explore key issues related to consumers' propensity to adopt integrated mobile Payment solution . The two research questions addressed were: What factors influence a consumer's intention to adopt mobile Payment? How are consumer-demographic and digital lifestyle characteristics related to mobile Payment adoption decisions?. A total of 425 individuals were solicited to participate in this study. These individuals were from a university, a corporation and a professional organization. A total of 299 responses (response rate = 70.4%) responded and included in the final analysis. The reliability of the constructs was measured by Cronbach's alphas and a series of ANOVA tests were performed .The findings showed that consumers' Intention to Adopt mobile Payment was influenced by the following factors: Transaction Speed, Transaction Convenience, Compatibility, Security Concerns, and Privacy Concerns . Also, Mbogo(2010) investigated the success factors attributable to the use of mobile payments by micro-business operators in Narrobi, Kenya. The study is based on a survey conducted through administration of questionnaires. The data was collected from a sample of 409 micro business entrepreneurs in Nairobi, Kenya. The study applies the theory of Technology Acceptance Model (TAM) which was extended to include other factors to help predict success and growth in micro-businesses. Analyses of the data revealed that convenience of the money transfer technology plus its accessibility, cost, support and security factors are related to behavioural intention to use and actual usage of the mobile payment services by the micro businesses to enhance their success and growth. Porteous,(2006) stated that there is appeal and utility of mobile banking and mobile payment services across the country of Kenya as there are probably more people with mobile handsets than with bank accounts. Kenya's population is estimated at 40 million people. This study focuses on the factors influencing the mobile payments usage by the micro business operators and applies the Theory of Technology Acceptance Model (TAM). TAM is a theoretical model that explains how users come to accept and use a technology (Davis, 1989). The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. These factors are perceived usefulness defined as the degree to which a person believes that using a particular system would enhance his or her job performance and perceived ease of use defined as the degree to which a person believes that using a particular system would be free from effort. These two factors are considered to be the primary determinants for adopting and using a new technology and are influenced by other variables such as security concerns, cost, convenience and satisfaction. The study adapted Technology Acceptance model but did not relate it to any system control which can prevent or reduce financial fraud. All the hypotheses were set using non-financial indicators.

#### **Gap in these research:**

The researchers still use technology acceptance model and listed the factors affecting consumer intention to adopt mobile payment. Their research did not predict or point out the existing interoperability issues which future research have to deal with. The research is conducted in Kenya's environment. It is necessary that similar research is conducted in Ghana to assess not only on behavioural intention of mobile usage but embody the current interoperability issues that can motivate the customers to adopt the current interoperability issues.

Viehland and Leong(2007), also applied the Technology Acceptance Model to examine factors such as perceived usefulness and perceived ease of use on consumer willingness to use mobile payment services. This study also includes exploratory research on external factors – convenience, security, new technology that affect mobile payment acceptance and use. The results show that although awareness of mobile payment services is reasonably high, only a small number of New Zealand consumers actually use mobile-payments. However, consumers acknowledge that mobile payment services can be useful, easy to use and convenient. The findings of most of these studies can be summarized by saying that in order for mobile payments to succeed, they must be secure (both in reality and consumer perception), convenient, easy to use and be offered a little or no additional cost to the consumer. For example, the mobile payment survey found 96% of respondents required confidentiality of data and 92% required little or no costs (Pousttchi and Zenker 2003). The purpose of this study is to assess consumer acceptance and use of their mobile phone for retail point-of-sale payments. The study did not relate it to any internal system control nor discussed the measures to reduce mobile frauds in Newzealand. In other words the study did state that in order for mobile payments to succeed, they much be secure (both in reality and consumer perception)..

Bradford and Hayashi(2007) conducted Mobile payments in Japan, South Korea and the United States. According to the researchers, despite the high expectations, mobile payments have not reached projected adoption levels. Understanding success factors in mobile-payments has become an important research goal. The study revealed that the lack of cooperation between the main players, including mobile payment companies, mobile operators, and independent providers, is the significant barrier to

mobile payments success. The forty-seven (47) respondents who completed the web survey included representatives of financial and banking institutions, mobile operators, third-party mobile payment system providers, phone manufacturers, mobile application developers, mobile technology consultants, usability consultants and mobile payment researchers from Asia Pacific region, Europe, Asia, North America and South America. The respondents revealed not only the barriers to success in mobile payments, but also provided their solutions to ensure success. The gap in this research is that it reports on the current status of collaboration among the main players, and finally, outlines the possible roles of mobile operators, mobile payment companies, and independent providers in successful implementations of mobile payment solutions. The research did not extend to the financial frauds and internal control of the mobile payment companies involved in the study. This research is aptly timely and emerging and distinct from the previous research as it points out areas of modern concern in the mobile companies which previous literatures have not paid attention to them but of very concern to the Ghana as a whole. Prior studies have found that user demographic traits such as gender (Ahuja & Thatcher, 2005), age (Morris, et al., 2005), and education (Doms & Dunne, 1997) affected technology adoption behaviours. A total of 425 individuals were solicited to participate in this study. These individuals were from a university, a corporation, and a professional organization. Prior to the survey, participants were given a description of the integrated mobile Payment solution. A total of 299 responses (response rate = 70.4%) were complete and included in the final analysis. The mobile payment solution should be compatible with consumers' lifestyle and the way they like to shop. This means that integrating mobile payment process seamlessly into purchasing processes, making mobile Payment fun and easy to use, and using mobile Payment to enhance consumers' lifestyle image should be among the top criteria during the design. The mobile Payment solution should address the various security and privacy concerns. Since consumers tend to not only view mobile Payment as a financial product but also as a technological product, consumers' technology-related lifestyle characteristics can have profound impact on their adoption decisions. Market segmentation using these variables is likely to generate meaningful results for marketers of mobile Payment solutions. Mobile Payment is still in its infancy both in the U.S. and around the world. The field presents ample opportunities for future research (e.g., enabling technologies, payment processes, consumer acceptance, etc.). Future research should take a consumer-oriented approach to first address the issues that are most important to consumer acceptance of mobile Payment rather than a technology or process-oriented approach. A theoretical framework that examines these issues and the interrelationships among these issues will be highly useful to both researchers and practitioners in their efforts to pave the way for mobile Payment adoption in the U.S. and around the world.

### **Gaps in these empirical studies**

The researchers pointed out areas that the previous research did not cover. They did point out that the process-oriented approach to mobile payment will increase adoption. The introduction of Interoperability is a process-oriented approach to resolve this problem. This research aims to fill this gap in empirical literature by responding to area that previous research could not resolved. Researchers did not predict the establishment of such levels of interoperability with high level of national government involvement.

### **2.2 Synthesizing the current state of theoretical debate in mobile payment industry.**

Even though previous researchers envisaged the growth in mobile payment in the future, however, the level of interoperability was not adequately predicted. Most of the researchers proposed that the advent of internet will increase online money transfers but the question of whether mobile payment customers being able to transfer money among themselves regardless of the network was not resolved or anticipated as happening today. The current debate is whether Government campaign on cyberfrauds will bring mechanism to institute proper internal control measures for the various stakeholders using mobile payment facility. The public has criticized and entertained doubt about the security of mobile payment interoperability. Theoretically, the level of frauds was at alarming rate prior to the launch of interoperability. Therefore if proper stringent control measures are not put in place, interoperability phase one, two and three as introduced by Ghana government will rather encourage fraudsters to devise various strategies to increase online fraud.

### **2.3 Theoretical problems arising from research debate in the mobile industry**

Critics argue out that prior research focused only on customer adoption of mobile payment. Current research extends this argument by including interoperability as a major milestone changes between the previous and current study. The other aspects to look at it are that interoperability can also generate fraud related issues which can reduce customers' adoption of the mobile payment companies. The involvement of various government campaigns is an indication that with the gradual increase in internet and network facilities in different remote areas in the countries, cyberfraud will reach alarming rate. This calls for critical theoretical problem to be resolved by different stakeholders using internet facility to consider decreasing rate of cyber fraud not only as affecting companies but to collaborate with software developers and policies that will strengthen to make interoperability experience a desirable one.

#### **2.4 Overcoming limitations to increase past research strengths.**

The use of mobile money has witnessed exponential growth over the past 9 years, with a year on year increase in the number of mobile money accounts as well as the volumes and value of mobile money transactions. According to statistics from the Bank of Ghana, the total number of active mobile money accounts increased from 8.3 million in 2016 to 11.11 million in 2017. This places Ghana on the global stage as one of the countries making headway in mobile money acceptability and usage. To further create convenience and rope in mobile money users into the financial ecosystem, the government initiated a move to create interoperability among the various mobile money operators. Considering the enormous growth in the mobile money sector, the move to create interoperability was a step in the right direction. Even though the prior research did not cover cyber or internet fraud in mobile payment industries, it documented clearly the empirical studies and theories used in their studies. Their studies pointed weak internal controls as a major limitation which some of the prior studies did not even cover. This study will build on this strength by adapting their theories in the study and apply them to make their studies significant. Despite these limitations, their studies can be improved if all the various stakeholders especially including government, developers and business users of the internet ensure that controls cover all relevant policies are put in place even before any corporate intranet can be developed. The limitation can also be overcome when technical and skilled personnel responsible for intranet developers are carefully supervised regularly to avoid any supervisory weaknesses in internal controls. Implementation of appropriate national policies by corporations on cyber frauds will go a long way to reduce cyber frauds.

#### **2.5 Key Assumptions and boundary of the study**

The research is based on assumptions that empirical data on mobile payment in Ghana are actually and indeed very limited. This is not mean an assumption because prior research has already indicated and encouraged more research in this field because data are not available. The second assumption is that, the secondary data that was used for the analysis is a country wide data which the results can be generalized and applied to similar environment outside Ghana. The research assumes that the interoperability was not resolved by the previous research therefore the information about this is not even available in existing literature. Therefore, the accuracy of the figures and the explanations of the phenomena is subject to the mechanisms of the reporting agencies. In Ghana, several agencies have made an effort to report the phenomena as the phases are executed by joint collaboration between mobile companies and government. The study assumes that the accuracy of the data reported are the best available data to use for this study.

Besides, the study assumes that top Management team of the mobile payment companies can influence the financial performance of their respective companies if collaboration is given to resolve issues on interoperability. Second, the use of diagrams and tables as statistical tool is based on the fact that the measurement can be illustrated with no error. That is, the behaviour of the variables will follow the exact data that is collected from secondary source. The unit of analysis for this study mobile payment companies duly registered with the Bank of Ghana. In addition, the study reviews some empirical studies on mobile payment companies. The literature reviews on other industries were not done for the simple reason that literatures are available from Ghanaian context. This study did not examine the demographic characteristics such as the age mobile companies have been in existence as they will be irrelevant to the study.

### **CHAPTER THREE: RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter spells out the methodological issues relating to the subject of interoperability on mobile payment companies in Ghana. Various researchers have used different methods and techniques for different studies on mobile payment companies as far as customer adoption of the mobile payment is concerned. However, there is no research on the concept of interoperability as previous studies did not cover. The choice of a method of study depends on a number of factors such as the expectation of the possible results from the study, the empirical studies underlying the study, the objectives of the study, availability and quality of the data to be used, the reliability of the methods used and the variables under investigation. This chapter presents a brief discussion of the research design and method, research format and research techniques, tools, approaches, instrumentation and devices. It also spells out data collection methods and the population and sampling procedure used as well as the significance, limitation and delimitation of the study.

### **3.2 Research Design and Method**

The research design is a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings. Parahoo (1997) describes a research design as “a plan that describes how, when and where data are to be collected and analysed”. This study uses a mixed research method (that is both quantitative and qualitative research methods) by the use of secondary data. The data collected was standard from reliable sources, allowing for easy comparability and understandability (Saunders et al., 2007). Quantitative research, if properly designed, can produce results that can be seen as real and unbiased as quantitative studies usually require extensive statistical analysis. According to Orodho and Combo (2000); in qualitative research, the information being sought is not about facts and figures. The research results may be affected by the subjectivity of the researcher. Burns and Grove (2003) describe a qualitative approach as “a systematic subjective approach used to describe life experiences and situations to give them meaning”. Qualitative research focuses on the experiences of people as well as stressing uniqueness of the individual. Holloway and Wheeler (2003) refer to qualitative research as “a form of social enquiry that focuses on the way people interpret and make sense of their experience and the world in which they live”. Researchers use the qualitative approach to explore the behaviour, perspectives, experiences and feelings of people and emphasise the understanding of these elements. Researchers who use this approach adopt a person-centred holistic and humanistic perspective to understand human lived experiences without focusing on the specific concepts the researcher focused on the experiences from the participants’ perspective

Mixed methods study approach is a rapidly evolving field of study both conceptually and practically. (Spratt, Walker, and Robinson, 2004) state that using multiple approaches can aid the researcher to capitalise on the strengths of each approach and offset their different weaknesses. Complete objectivity is impossible and qualitative methodology is not completely precise because human beings do not always act logically or predictably (Holloway & Wheeler 2002).

#### **3.2.1 Justification for the mixed method**

Johnson et al. (2007): define mixed method as “an approach to knowledge (theory and practice that attempts to consider multiple viewpoints, perspectives, positions, and standpoints (always including the standpoints of qualitative and quantitative research)”. The purpose of using mixed method is useful because of the following obvious reasons: first, the two approaches together provide multiple view point, address biases and give subjective and objective views. Second, quantitative study will be followed-up qualitatively to obtain more detailed information (Alrubaiee and Al-Nazer, 2010). Third, both quantitative and qualitative data together will provide a better understanding of the research problem than either of them. Lastly, either quantitative or qualitative will not be enough to answer all the research questions than the two together can answer (Kerliner and Lee, 2000).. According to the type of research questions posed in this study, a qualitative and quantitative approach will be appropriate. In Ghana, the customers, public and managers have little understanding of the concept of interoperability coupled with its challenges and implementation (Frimpong and Martins, 2010). Also, research on interoperability has received less attention in Ghana because existing literature did not address it. Hence, a mixed method of study could enable this study to gain insights into the mobile payment industry. Apart from the quantitative approach which assesses the benefits in figures, the qualitative aspect would probe the contribution of interoperability from the perspective of government –management relationships. Hence, the outcomes of the mixed approach will likely help management identify barriers to the effective implementation of interoperability concept.

### **3.3 Research format**

The study is based on the descriptive method. The descriptive method explain the relationship between two or more variables in which the effect on one variable is caused by the other variables (Saunders et al. (2007) .The format will help to test the research questions developed on the premises that interoperability can influence a lot of factors that can ultimately have influence on financial performance of mobile payment companies. To apply the descriptive method, sequential process will be adopted in this research to keep the whole project orderly. According to Creswell (2003) sequential process is the most straightforward of all the major mixed methods approaches. Sequential process is characterized by the collection and analysis of qualitative data followed by the collection and analysis of quantitative data. The analysis of qualitative data comes as a prelude to quantitative data and the two methods will be integrated during the interpretation phase of the study.

#### **3.4 Method of applying the research method**

This research follows philosophical and epistemological approaches, namely positivism and constructivism which have dominated the search for knowledge. The positivist approach emerged following questions raised concerning the approach employed by researchers at the time, which was described as speculative, without empirical stance. In the thinking of proponents of positivism, as espoused by Sarantakos (1993), the methods of research ought to be scientific, in the study of society and people; as it was seen rather than as they were interpreted by philosophers and theologians. The positivist approach was thus characterized by a shift in paradigm from philosophy to science and from speculation to the gathering of empirical data. Recent

advances in qualitative research give much attention to the constructivist philosophical approach. This approach describes reality as experienced by respondents, and measures reality, employs methods of data collection that are largely non-quantitative and

aimed at exploring social relations. This approach is guided by the principle that reality is a social construction, created when people interact and exist independently of specific individuals or groups interacting with one another (Sarantakos, 1998). In essence, positivism holds that the researcher is separate from the one to be researched and the findings are true reflections of what is on the ground, whereas constructivism is transactional-oriented with findings subjectively stained and shaped (Lincoln & Guba, 2000). This is how I will apply this research format. There is a strong argument that both positivist and constructivist approaches are conflicting. For Lincoln and Guba (2000), positivism is both real and could be upheld, whereas constructivism holds that reality is created by individuals and groups. Constructivist realism sought to establish the harmonizing roles played by quantitative and qualitative methods in the analysis of social phenomena. This study will adopt constructive realism since the purpose is to describe reality as experienced by customers in the mobile payment industry as well as researcher's description of what is on the ground. In keeping with the objectives, this study used descriptive and format; in a mixed method, that incorporates both qualitative and quantitative lines of enquiry. Descriptive research will be steered to describe phenomena as they happen, and identify and obtain information on the characteristics of interoperability in practice. This approach is appropriate in discovering and describing the characteristics of the relevant issues within mobile payment industry.

### ***3.4 Research Instrumentation***

According to Parahoo (1997), a research instrument is “a tool used to collect data. An instrument is a tool designed to measure knowledge attitude and skills. In this study the researcher used the data collection instrument because the data from participants were words in the context of the research problem. (Holloway & Wheeler 2002). To ensure the credibility of the data collected, the researcher laid aside preconceived ideas by taking notes of the exact data as reported. This allowed for flexibility in the collection of data. The rationale for choosing this method was to obtain different perspectives on the phenomenon under investigation and prevent researcher bias and approach the phenomenon without preconceived ideas.

The study uses simple format to gather secondary data from government archival sources such as Statistics from the cybercrime unit of the CID, Central bank of Ghana and published information from Ghanaian widely used paper, daily graphic for its analysis.

The main function of the research instrument here was to ascertain the needed information to measure the variables of interest which result from interoperability. The instrument was fundamentally designed to meet the research objectives one, two and three (Research question one, two and three). The quantitative data was collected through secondary sources to provide the needed mathematical information to address the research objectives.

### ***3.5 Data Collection Method***

The study will employ secondary data based on the objectives of the study which was related to the research questions. The secondary data was used to support analysis. Secondary data collection is justifiable because much work has already been done to provide reliable records of mobile companies for public use. The secondary data collected was reliable because information has been made available by public use by agencies recognized by the respective authorities and mandated to published such data for public use. Therefore the information always the most authoritative since the information had not been filtered (Cooper and Schindler, 2011).

#### ***3.5.1 Sources of Data***

The sources of data for the study is from authoritative sources such as the preferred Ghanaian published paper, Daily Graphic, statistics from government agencies mandated for publication of reports on interoperability on various mobile payment companies in Ghana. The reports of mobile payment companies websites provided information on the current changes taken place in the mobile payment companies. This enables the researcher to obtain information on factors that attract various stakeholders to contribute immensely to the interoperability

### ***3.6 Population and Sampling procedures***

The populations of the study are the four mobile payment companies registered in Ghana and all their registered agents or the merchants on the field as well as all the interested stakeholders such as government customers and the general public who are contributing in various ways to ensure the introduction and the success of interoperability concept.

Parahoo (1997) defines population as “the total number of units from which data can be collected”, such as individuals, artifacts, events or organisations. Burns and Grove (2003) describe population as all the elements that meet the criteria for inclusion in a study. Burns and Grove (2003) define eligibility criteria as “a list of characteristics that are required for the membership in the



target population”. The criteria for inclusion in this study are: mobile payment companies must be registered in Ghana, and must collaborate with current government in the implementation of interoperability.

The study adopts probability sampling because of the intention to include all stakeholders. In this study, it is the only possible approach in this situation which will yield enough accurate information for the study. The sampling size data which was quantitative was collected using secondary information of the mobile companies.

### 3.6.1 Sampling frame and sampling size:

In probability sampling, the sampling size are not known but every unit has a likely chance of being selected. A carefully selected sample can provide data representative of the population from which it is drawn. Holloway and Wheeler (2002) assert that sample size does not influence the importance or quality of the study and note that there are no guidelines in determining sample size in qualitative research. Qualitative researchers do not normally know the number of people in the research beforehand; the sample may change in size and type during research. The rationale for choosing this approach was that the researcher was seeking knowledge about the interoperability within the mobile payment companies. In this study only secondary data was used so the procedure would be done as follows: The researcher will seek the assistance using secondary data from various stakeholders website. Possible information obtained was verified for its validity and reliability before they are used.

### 3.6.2 Variable Definitions

This research will use specific variables. This section will be used to define these variables theoretically

Terminology	Meaning
Interoperability	Characteristic of a product or system, whose interfaces are completely understood, to work with other products or systems, at present or in the future, in either implementation or access, without any restrictions
Philosophical	to stay detached and thoughtful in the face of a setback, or to approach a tough situation in a level-headed way.
Epistemological	the study of knowledge and justified belief.
Positivism	the view that whatever exists can be verified through experiments, observation, and mathematical/logical proof.
Constructivism	based on observation and scientific study -- about how people learn.

### 3.7.2 Method of Soliciting Information

This study use secondary data for analyses based on the objectives of the study which was related to the research questions, methods of analyses and reasons for choice of analyses. It is qualitative and quantitative information that has been used before. On the other hand, secondary data refer to information already in existence. Such secondary data is information obtained mostly from different published sources like audited financial reports by companies or statistics published by private and government agencies.

In this study, both qualitative and quantitative data will be analyzed. It is qualitative and quantitative information that can be obtained from the audited financial statement of the mobile. These will be mainly quantitative since the information will be mainly numerical which will involve statistical analysis. Research one, two and three will be measured quantitatively using secondary data.

### 3.7.3 Ethical Considerations

According to Bell,(2005),research is considered ethical when it satisfies the demands of justice, respect, and protection for those involved . Hence, ethical issues ought to be considered whenever a research will be associated with the collection of data from human participants. Further, individuals’ anonymity and confidentiality will be assured and maintained, and every finding will be treated with utmost confidentiality and will be for the purpose of the research only.

## CHAPTER FOUR : ANALAYSIS

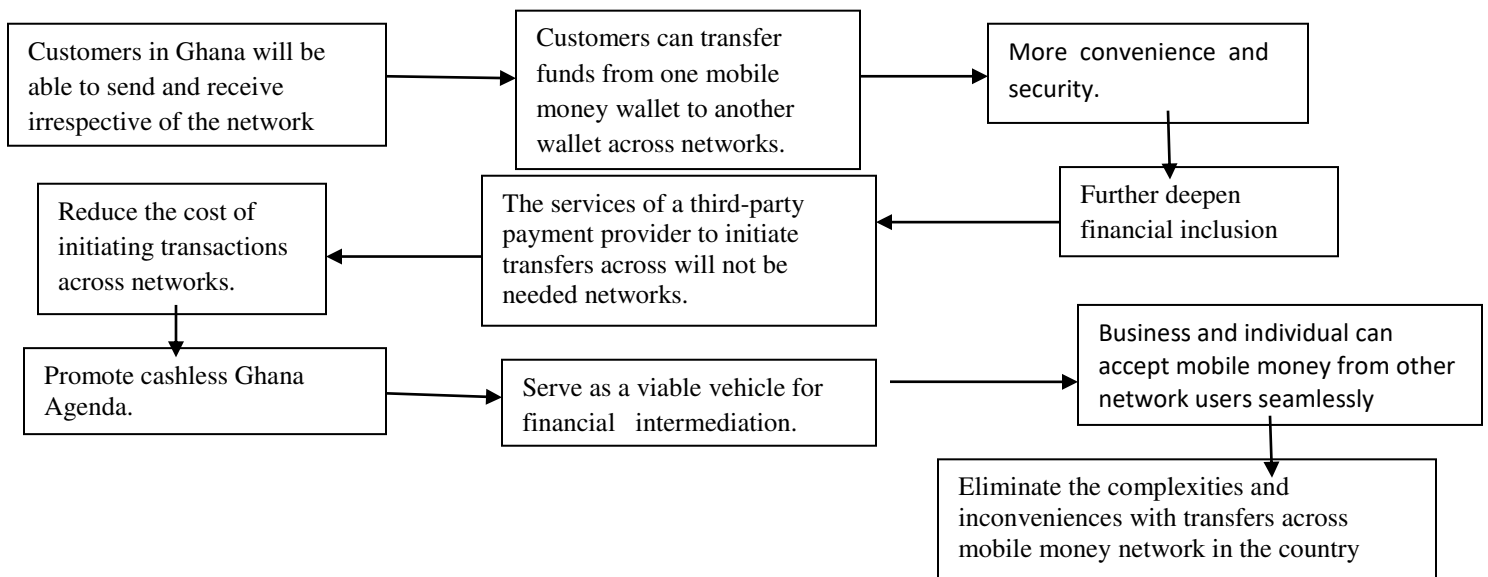
### Theoretical link on the meaning of interoperability

Level of interoperability	Interpretation	Date launched	Source
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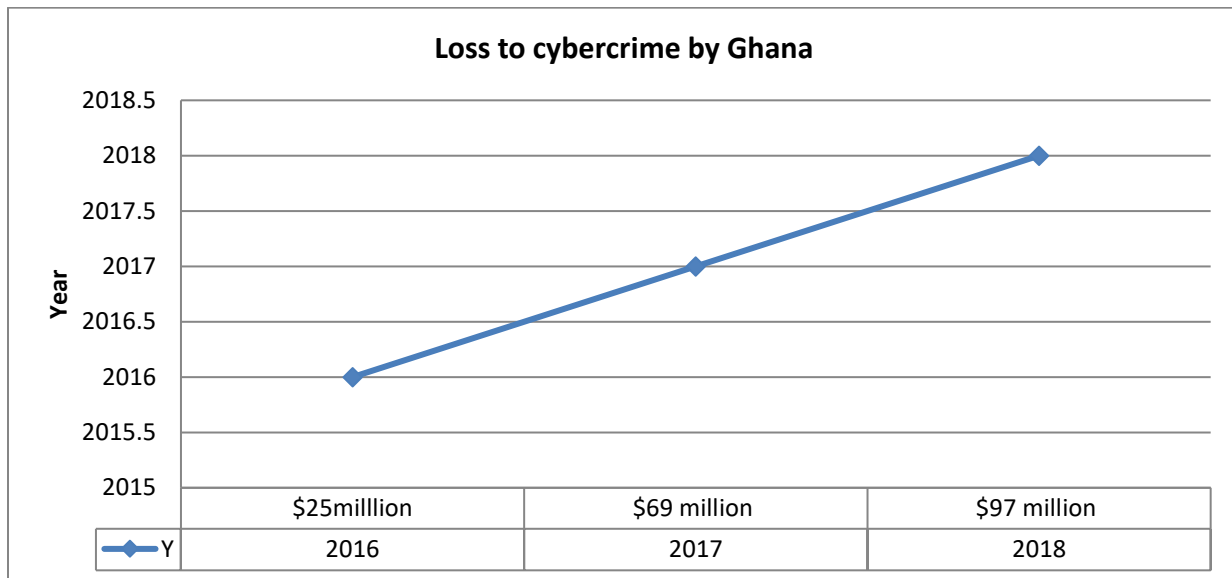
Interoperability <b>Phase one</b>	interconnection of the mobile money platforms and the Ghana National Switch (gh-link system),	May 10th, 2018 May 08 , 2018 , 11:45	Daily graphic,May 2018.Graphic.com.gh
Interoperability <b>Phase two</b>	the interconnection between Mobile Money and the e-zwich Payment Systems.	<b>September 10,2018</b>	Daily graphic,May 2018.Graphic.com.gh
Interoperability <b>Phase three</b>	should be possible for an operator, agent or merchant with one phone and SIM, to be able to load electronic funds onto the wallet of the customer regardless of the network.	<b>Currently working on.</b>	Daily Graphic

Phase One of the project, launched on May 10th, 2018 saw the interconnection of the mobile money platforms and the Ghana National Switch (gh-link system), but not the E-zwich Payment Systems. It also allowed the transfer of funds between the various mobile money services provided by the telecom companies. The second phase has completed the interconnection between Mobile Money and the e-zwich Payment Systems. The phase three should be possible for an operator, agent or merchant with one phone and SIM, to be able to load electronic funds onto the wallet of the customer regardless of the network .Contrarily, previous studies did not include these major expansions. Previous research only focused on consumer adoption of mobile company without incorporating or predicting a stage of integration of mobile transactions among competing firms.

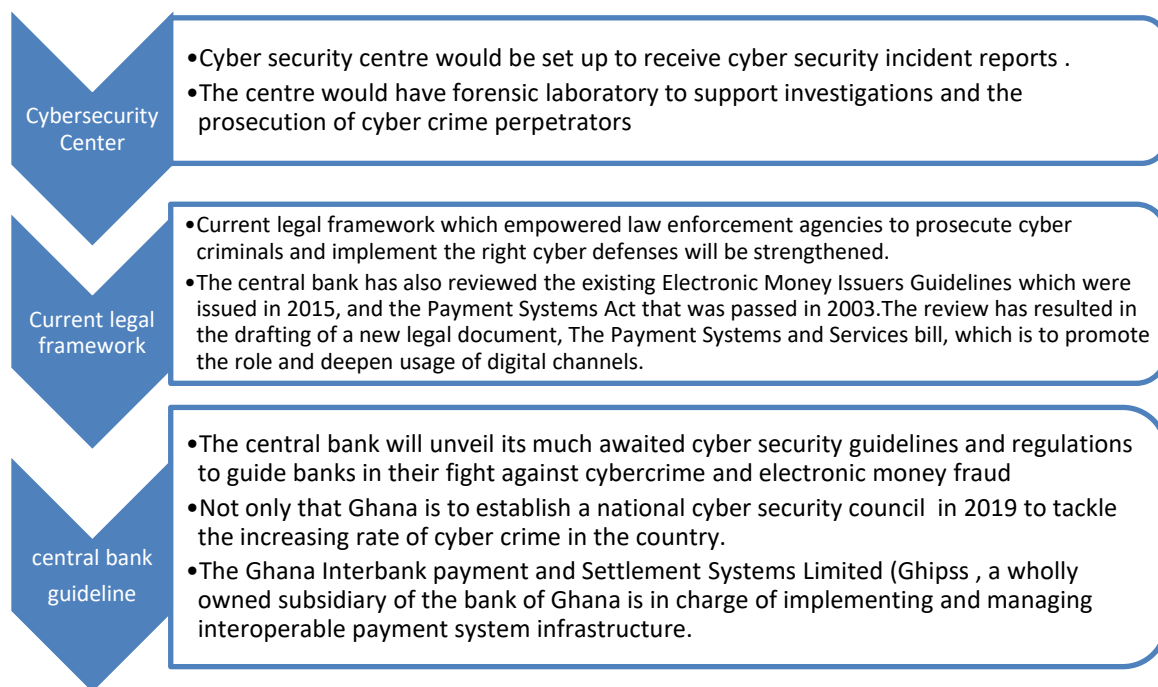
**Fig. 2 Benefits of Interoperability**



**Figure 3 : Theoretical link and benchmark for the comparability of current with previous study**



Statistics from the cybercrime unit of the CID revealed that the country has lost about 25million dollars in 2016 increasing to some 69 million dollars in 2017. As of August of 2018 , the loss to cybercrime was as high as 97 million dollars. It is in this light that some of the nations around the world such as Ghana set aside three –day international workshop on Cyber-Security Awareness Month(NCSAM),to respond to the increasing spate of cyber-crimes and cyber security breaches which could potentially undermine the gains from Ghana’s digitalization agenda. This research work considers both cyber fraud and the frauds taking place at merchant places. Contrary, previous studies did little to cover frauds in mobile companies. Previous studies did not predict that cyber frauds can occur in mobile payment companies to such an alarming rate. The reason being that the internet facility has not extended to remote areas of the developing economies as seen today.



## DISCUSSION OF FINDINGS.

The national development of interoperability has been the recent substantive, methodological and theoretical developments in mobile payment industry. As part of Government of Ghana's initiative to maintain The second major changes happening in the payment industry to launch Phase two of the Interoperability platform which concludes the Financial Inclusion Triangle, and ensures universal interoperability, all the different stakeholders must collaborate. This will make Ghana one of the few countries in the world to attain this feat. Phase One of the project, launched on May 10th, 2018 saw the interconnection of the mobile money platforms and the Ghana National Switch (gh-link system), but not the E-zwich Payment Systems. This allowed users to make payments from Mobile Money wallets to bank accounts and vice versa. It also allowed the transfer of funds between the various mobile money services provided by the telecom companies. The second phase has completed the interconnection between Mobile Money and the e-zwich Payment Systems. Thus, the interconnection of mobile money and e-zwich platforms, to the gh-link platform means customers can conveniently move funds across all three platforms: bank accounts, Mobile Money wallets and the e-zwich payment systems. Ghana Government on 28th November, 2018, lauched this universal interoperability - known by players in the fintech and banking circles as the Financial Inclusion Triangle, because it interconnects three payment platforms; mobile money, bank account and e-zwich and is expected to remove the constraints faced in trying to move funds around, in real time. This should make providers more efficient and enable customers to accomplish more within the same time available to them. All of these important initiatives of government are to quicken the digitization of the economy. Importantly, it will improve financial inclusion by bridging the gap between the banked and unbanked. It will also enable free flow of funds between and among all the three platforms; allowing the banked and the unbanked to interact at the same level. The benefits to business and ordinary Ghanaians will be enormous, with endless possibilities on the horizon .The quick flow of funds enabled by the universal interoperability, should also translate into quick turnaround for businesses, because producers, wholesalers and retailers can receive funds in real time in order to deliver the goods to customers, regardless of which part of the country, they find themselves. With the conclusion of phase two, the additional challenge of Phase Three can begin .The phase three, is mobile money operator/agent/or merchant interoperability. The phase three should be possible for an operator, agent or merchant with one phone and SIM, to be able to load electronic funds onto the wallet of the customer regardless of the network. An agent currently needs to keep different float accounts for each operator to serve customers. So, when the float of the agent for a particular operator runs out, the agent is not able to serve customers from that operator even though he or she may have electronic funds sitting idle on another network leading to the agents turning away customers not because they do not want to serve them, but they simply cannot use the float they have for one network operator for another. "This status quo is not efficient and affects both the agent's output and profitability as well as puts a spoke in the wheels of the cash-lite agenda. This is major challenge to fix so that anybody who walks into an agent's location can get service once there are electronic funds available and also allows customers to have wider access to mobile money service. The Board and Management of the Ghana Interbank Payment and Settlement Systems Limited (Ghipss), Bank of Ghana, Financial technology (Fintech) companies, the telecommunication companies, and all the partners are to be commended for their cooperation and contribution towards the attainment of Mobile

Money Interoperability in Ghana. Theoretically, the study has implications for shaping the literature by considering not only the mobile payment adoption as the key component to financial performance but also provide theoretical measurement for inclusion in developing interoperability theories. Importantly, While the literature so far on interoperability is limited on the current issues, the study reveals that interoperability is a valuable asset to both the companies and the nation as a whole for competitive advantage. In this connection, the outcome of this study adds a new dimension of the role of key stakeholders on interoperability towards increasing mobile payment performance.

## CONCLUSION

This research makes a major contribution to the body of knowledge. While there have been several contributions to the literature on the adoption of mobile payment, empirical studies did not treat interoperability issues. This research attempted to address these shortcomings by extending the scope to embrace recent concept on interoperability. There are benefits for the mobile payment companies and the Ghanaian economy in general. Even though this work cannot be considered as having completely filled existing gap in the subject of study, it has added to existing knowledge. This is very evident in the light of interoperability which are of national and international concern by various Government but were not covered in the previous research works. This research does not focus on consumer adoption as revealed by previous researchers but takes into consideration the major national changes happening in mobile payment companies which can influence consumers adoption of the mobile payment transactions. The focus of the practical implication is that it cause Ghana and other developing nations to make long-term plans available for economic growth. Practically, the study reminds mobile companies to collaborate with other stakeholders to make interoperability a success. This should help in understanding the benefits of interoperability in promoting and developing the struggling mobile payment industry in the developing economies. The mobile payment market could be developed, and more qualified international companies attracted to bring in foreign direct investment into the country. Also qualified investors who previously could not invest in mobile companies shares will be encouraged to do so once interoperability are implemented successfully. This will mean increased numbers of policies in practice, hence contribution to the development of the stock market, which has been bedeviled by low number of companies listing (Yartey and Adjasi, 2007).

The outcomes of this study also bring to the attention of managers of mobile companies to make greater contributions to market orientation. In this case management should be able to know which management style, organizational and external factors influence their financial performance. The effect is that Management by exception' for certain specific tasks can be applied on interoperability phases to make its implementation a success. The study will have the potential of aiding managers to compete effectively to increase market shares as limitations on customers financial transactions are removed and customers and businesses can now transact financial transfers freely and without any limitation.

## Recommendation and the Directions for further research areas

The methodological approach in this research is quite different from the general approach in previous research works. First, this research adopted descriptive statistics and the focus is on the current major changes happening in the mobile payment industry. The research therefore avoids the loss of data on the current events. The uniqueness of this current work is that it includes the current major changes happening in this industry which will serve as attraction to foreign investors. Competition enhanced by the entry of foreign investors would ensure mobile payment sector development and enable the country to have access to international capital markets. Mobile Companies are constantly seeking unique ways of offering services to customers'. The willingness and the ability of managers to respond to changes in the industry would determine their success in the industry. Besides the methods used in this research, future researchers must also focus on assessing the potential benefits of interoperability especially on phase three which is yet to be implemented or launched. What will be policy and practical implications to industry leaders and their company's performance when the interoperability phase three is launched?. Future researchers can also look at the incremental future growth of mobile payment companies on the market once phase three interoperability's is implemented as compared with the normal banking sector. Will mobile payment companies increase in competitions and claim larger market share over their normal competitors in the banking industry. Another focus area will be the internal control issues that must be put in place for each of the stages of interoperabilities. Finally, since interoperability phase three will focus on agents or merchants levels, it is imperative for future researchers to use large data from agents even at remote villages to seek their opinion on how the third level of operability will be beneficial to their operations in Ghanaian environment.

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