

# The Roles of Mobile Payments on Accelerated Financial Inclusion: An Evolving Framework

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**Abstract**— Unprecedented developments in information and communication technology have influenced business activities worldwide known as e-business. From this point, the use of mobile technology for mobile phone devices has transformed the way people to use phones profoundly. These devices are equipped with functionalities not only to phone someone else but also to surpass telephony needs, which inspire the evolution of mobile services. Mobile payments, for example, are able to reach people in remote areas and lack of financial services. This paper aims to show how the roles of development of payment systems in business communities from the beginning of the existence of payment systems to these current ones for solving business transactions. The composition of this paper is arranged into five parts. The first part demonstrates definitions of mobile payments and its ecosystems, the second one explains how the financial inclusion is conceptualised, then steps of evolutions payment systems before and after the mobile payments are introduced. The paper demonstrates the next development of payment system in the 20th century when the first credit card was introduced officially in the 1950s, then the first electronic payment via telegraph is launched. And finally, a mobile payment was offered at the first time in 1997. The fourth part explains how mobile payment have a role to accelerate financial inclusion. With mobile payments, people who have uncovered banking and other financial services could access such financial services. The last one is conclusion and implications for future research

**Keywords**— roles of mobile payments, financial inclusion, evolving framework

## I. INTRODUCTION

Mobile financial services have become an unprecedented development of information and communication technology (ICT) and have affected business communities worldwide with their transactions via remote distribution channels. A previous channel for those activities, known as electronic business, has been explored more intensive to form its latest channel as a mobile payment [1]. This is because the use of mobile technology for mobile phone devices has transformed the way people to use phones profoundly. These devices are equipped with functionalities not only to phone someone else but also to surpass telephony needs, which inspire the

evolution of mobile services. This advancement of technology also has accelerated in mobile payments where goods and services are traded without a physical cash. The technological progress in ICT offers potential new services from the adoption of existing payment instruments to enhanced capabilities and requirements new channels of for introducing new payment system initiations[2]. One of them is a cashless payment which eliminates the usage of money as a medium of exchange for goods and services allowing an electronic transfer payment and non-electronic payment via a mobile device.

Accepting of cashless payment through mobile devices has a number advantages for consumers and retailers. Unlike traditional cash payments, the advantages of mobile payment for consumers are convenience and security, while the benefits for retailers are cost and engagements [3]. According to Greenacre in [4], mobile payments involve people using electronic money and mobile phones in which customers have to deposit some money with ‘a money issuer’ issued by non-banking institutions such as internet providers or telecommunication companies, in conversion for e-money. Hartmann in [2] defines broadly e-money as an electronic store of monetary values on technical devices that may be widely be used for making electronic payments. With the use of mobile phones, customers are able to use their e-money to trade with other customers. Customers can also convert their e-money back into regular money through agents. In some emerging market countries, mobile payments increasingly used as alternative currency that operates entirely outside the banking system. This process is minimalizing banks in the payments systems.

Meanwhile, adoption of mobile telephony to assist financial services development has spread in a number of nations both developed and developing

ones. This adoption has expanded financial services to people who live in the isolated areas to enjoy the services. In Kenya, Africa, for example, has developed M-PESA, a small-value electronic payment and store of a value system which is accessible from ordinary mobile phones [5]. This mobile payment system is adopted by 9 million Kenyan to do various financial transactions. Kenyans in remote areas, where the most of them are the poor people are helped by M-PESA to reduce potential financial exclusion in order to do banking activities such as saving, withdrawing, transferring and/or credit so on. Those practices that banking services have could be enjoyed by people who are unreachable by banking operations in the past [5]-[7].

Mobile payments are famous enough in developing countries and could be general platforms that transform entirely for economies in all countries. This kind of payment has been deployed at least 110 money mobile systems with more than 40 million users worldwide in 2013 [8]. According to Donovan [8], M-PESA is a pioneer how mobile payment used to penetrate isolated areas to obtain banking services in Kenya where in 2011 more than 20 million users with US 500 million transferred using M-PESA in six African countries.

This paper aims to show how the roles of development of payment systems in business communities from the beginning of the existence of payment systems to the current one for solving business transactions and covering unbanked people to reduce financial exclusion in developing countries in Asia, Africa, and South America. The composition of this paper is arranged into five parts. The first part demonstrates definitions of mobile payments and its ecosystems, the second one explains how the financial inclusion is conceptualised, then, steps of evolutions payment systems before and after the mobile payments are introduced. The fourth part explains how mobile payment has a role to accelerate financial inclusion. The last one is conclusion and implications for future research.

#### *A. Conceptualizing Mobile Payments*

Paying an article of good just pressing keyboard with the fingers our mobile phones; buying an electronic ticket just clicking certain menu in our gadgets are methods in which communities can pay electronically. This kind of methods is becoming more and more sophisticated leading to new choices to transferring or even depositing money [2]. Mobile phones and other communication devices offer high convenience, flexibility, and speed and lower fees than traditional payment instruments to be promised and also new ways to access accounts for using payment services. Payments initiated through mobile phones are called mobile payments. The payments made via mobile phones can be conducted to pay for digital goods delivered over the mobile phone, for goods ordered via the internet, and for goods or services bought in the physical world [9]. Mobile payments as one system to mobile phoney supply tremendous promises to facilitate the flow of money among rural and poor families at much lower costs, bringing the bank to those who unbanked in most developing countries [10].

With supporting of mobile payments system might increase economic productivity and personal convenience significantly. However, the widespread deployment and adoption of mobile payment systems need action from a complex ecosystem of organizations (e.g. mobile phone service providers, banks, retailers and others) to create a mobile payment system [10]-[11]. As an instrument of commercial or financial transactions mediated through mobile phones, a mobile payment system is able to increase global value of all commercial or financial transactions exceeding \$900 billion globally in 2016.

Implementation of the mobile payment system and deployment of its ecosystem will support installed mobile payment system to function this device in its operations. The ecosystem in mobile payment systems is *“an economic community supported by a foundation of interacting organizations and individual. This economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The members also include suppliers, lead producers, competitors, and other stakeholders*

who coevolve their capabilities and roles” [10]. These mobile payment ecosystems are network organizations and individuals that must be in place for mobile payment services to take root, disseminate, and go to scale. Mobile payment ecosystem has some players who play importantly different roles. The players and their roles are:

TABLE I  
THE PALYERS and ROLES

No.	Players	Assets and Capabilities	Incentives
1	Mobile Network Operators (MNO)	<ul style="list-style-type: none"> <li>• Mobile infrastructure</li> <li>• Massive customer bases that include low-income segments</li> <li>• Strong branding</li> <li>• Customer trust</li> </ul>	<ul style="list-style-type: none"> <li>• Acquire customers</li> <li>• Reduce airtime distributional cost</li> <li>• Capture additional revenues</li> </ul>
2	Banks	<ul style="list-style-type: none"> <li>• Banking licence and infrastructure</li> <li>• Regulatory compliance expertise</li> <li>• Ability to facilitate foreign exchange, clearing, and settlement</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce cost significantly of delivering financial services</li> <li>• Establish presence in new customer segments and new geographic areas</li> <li>• Meet service obligation and CSR goals</li> <li>• Capture additional revenues</li> </ul>
3	Agents	<ul style="list-style-type: none"> <li>• Physical points of presence</li> <li>• Customer trust</li> <li>• Knowledge of customer habits</li> </ul>	Earn commission on transactions
4	Retailers	Physical points of presence	<ul style="list-style-type: none"> <li>• Reduce cost of handling cost</li> <li>• Reduce queues at peak times</li> <li>• Manage inventory more effectively</li> </ul>
5	Regulators	Authority to impose regulations and monitor and enforce compliance	<ul style="list-style-type: none"> <li>• Promote financial inclusion</li> <li>• Enable wider range of payment choices</li> <li>• National socio-economic development</li> </ul>
6	End Users	Relevant needs	<ul style="list-style-type: none"> <li>• Reduce risk of carrying cash</li> <li>• Increases access and affordability of payment, remittance, and other financial services</li> </ul>

Sources: [10]

When the mobile payment system applied, there are some obstacles within the ecosystem related how this system is operating and how the interaction of players. Those are:

- users, user adoption and experience, mainly related to security, privacy, trust, fraud and risk perception. It also includes psychological inhibitions caused by the technology and new services.
- business models, business model problems arising from, restrictions and complexity,
- including obstacles to adoption and the need for an ecosystem with multiple operators and
- relations, this category also includes the remuneration and commissions of agents paid to
- re-sellers, the problem may be either the large or small amount of commission paid.
- suppliers, lack of infrastructure and service coverage (availability and capillarity); the need for new skills on the part of the agents; competition with traditional (formal and informal) service providers; and lack of banking expertise.
- price/cost, on the user side, the constraint may be the cost and price of devices and services; on the supplier side, the problem is the financial sustainability of the initiatives. This category also includes the difficulties of remaining price competitive for low-value transactions
- regulation, the need for public regulation, especially to enable innovative business models in highly regulated environments. Other restrictions and obstacles were also identified, such as conservatism (opportunities for new services, different from traditional banking services); economic constraints; and a specific market context [12].

An issue has been developed by [13] that mobile payment system could assist to reduce the poverty rate in Africa especially in Kenya and Tanzania. That ability obtained through five potential mechanisms for short, medium or long term effect of economic development, how much cost to apply this device, market agents' behaviour, price dispersion and networking of mobile phone's providers. Those are integrated to generate a complicated pathway for how mobile payment system works. To ensure integrity for payer, payee and payment system, there are major rules of thumb in designing any payment system. Those include that (i) nothing happens without authorization, and (ii) nothing happens without generating sufficient pieces of evidence. Mobile payment in mobile

money shape is the most cost-effective way to extend the reach of formal financial services, but its potential to achieve financial inclusion is to be realized. The lack of a genuinely enabling policy and regulatory framework is hindering progress in many markets. There are a number of additional problems preventing the expansion of mobile money. Firstly, low levels of financial literacy (or literacy in general). Secondly, there are commercial issues such as appropriately established distribution networks. In addition, improving the design of mobile money products as well as developing the essential technology interface needed to meet customer requirements (e.g. services available in local languages) are also considered as obstacles. From a commercial perspective, mobile money is an emerging sector and it is understandable that, at such an early stage, there are commercial issues that providers are still trying to address.

Reference [8] claims that using of mobile payment is successful due to considerable cheaper than an alternative to cash. At low transaction amount or for informal money transfer, particularly in low-income people in developing countries. Lower costs directly translate into money the poor can keep in Kenya, for example, using M-PESA compared with traditional forms of remittances. Reference [8] also states that adoption of mobile payment emerges some issues in operating. Firstly, it is about the technological issue that covers how far mobile devices technology developed through the birth of smartphone, and biometrics. Secondly, the changing role of agent network. This changing is because the mobile payment providers realise that important agents in their business model, four interlinked problems have emerged: profitability, proximity, liquidity and trust. The agent model is founded on the exchange of cash through a franchise model, so the agent's profitability is essential for success.

#### *B. Conceptualizing Financial Inclusion*

As we know, there are 2.5 billion people globally without formal banking accounts in which most in developing countries [14]. Low levels of financial inclusion represent a barrier to socio-economic development in developing countries. That is why, according to World Bank, mobile payments more

popular in developing rather than in developed ones. Adoption of mobile money or mobile payments is currently lower in more developed countries, where more people have bank accounts and the mobile phones are evolving as just another channel for payments for other purposes. In emerging countries, however, mobile money or mobile payments are being used strategically to enable people without bank accounts to conduct financial transactions. Therefore, emerging of increased unbanked people to do financial transactions in developing countries is more surprised.

Financial Inclusion (FI) is a condition in which all people have access to the financial system, not only to banks but also other financial institutions. These institutions are encouraged to increase the distribution scope of banking services to rural areas [6]. FI is more attractive to people in Africa where covering banking sector to the poor is low. The main objectives of financial inclusion are in general to serve the poor better life especially in terms of financial access. All part of the society has same chance to access financial inclusion for both bank and other financial institution to get opportunity improving their standard of living and stimulating social economic activities. The poor to be excluded from such service due to unavailability banking services; inappropriate conditions attached financial products, and self-exclusion i.e. cultural, religious, psychological barriers and mistrust [15]. Financial sector development has contributed to improving the growth process but financial services are clustered around major urban areas. There are, however, current evolutions which can foster or at least transform the situation of financial inclusion in Africa with the emergence of mobile banking and the rising economic growth in many of these countries [16]-[17].

Research finding supports the view that policies favouring financial inclusion should target certain groups of the population like women and young people. The finding also suggests mobile banking is driven by the same determinants than traditional banking in Africa. There is consequently no different pattern to explain the use of this alternative form of banking. Second, we show that barriers to financial inclusion differ with individual characteristics African countries have low financial



inclusion in comparison with the rest of the world. As financial inclusion can contribute to alleviate poverty and boost economic growth, understanding the determinants of financial inclusion in Africa is a major issue. In this paper, we investigate this question for a large sample of individuals from 37 African countries [15], [18]-[19].

Reference [15] claim that the main factors that determine FI more advanced in Africa education rate of rural people, the formal income of women, and informal credit that is easy to be accessed. Other determinants are strong motivation to save some portions of women formal income to be consumed in the future. That could enhance the capacity of the individual to improve the standard of living. Informal finance is not able to substitute formal finance in all aspect of FI in Africa. Reference [17] state African countries thank the growing mobile phone financial which is changing rapidly the way of poor people to take some benefits for accessing the financial service. Mobile phones are able to bridge the gap by enabling poor rural people to save conveniently from the comfort of their homes or the vicinity of their business sites, solving both the problems of distance and transaction costs that have hindered traditional financial services providers in the past from tapping the resources of these market segments. Use of mobile phones financial services should, therefore, be encouraged and enhanced throughout the continent.

According reference [16], globally, FI is a major policy concern for governments across the world. The lack of access to a large percentage of working age adults to the formal financial sector is a genuine global policy concern. However, other than the aspect of providing access, FI includes issues such as helping people manage their resources in a better way and building financial capabilities.

### *C. Evolution of Mobile Payments*

The payment system has evolved from the physical of note and coins to writing checks, to transferring payment cards details over the phone or the internet. From the physical to non-physical shape of financial transaction, this evolution has involved tangible tokens of value to an exchange of information between parties in which the main goal

in the long term is to integrate all legacy payments and to provide an alternative that uses the different channels in a homogenous way [20]. There are some factors drive the evolution of mobile payment. The factors are natural adoption progression; convenience factors; social use factors; and advanced technology.

How the evolution process in payment method history by person to person is started [ 21]. It began in in ancient Egypt where first paper used for purchasing goods instead of barter. In ancient times, transaction whether by consumers to consumers or consumers to business were individual face to face facilitated by bartering physical goods. Later paper money was introduced as the payment method. Cash has withstood the test of time and today remains the number one person to person instrument. In the first century before Christ (BC), the first cheque is used by Romans. Although cheques have been around for millennia, they have been used for 100 years for person to person transaction, even it predominantly used for most of the 20th century by the wealthy people for the financial transaction and achieved in a peak in usage in 1990's. In 1914, first charge card was introduced by the Western Union. It was only since 1950's, payment cards have been considered and acceptable payment tool.

Then in 1918, first electronic movement of money via telegraph was used for transaction tool. Digitisation increased the size and speed of money flow of each transaction. Growth in online commerce has been a driver of online payment innovation and subsequently person to person money transfers. Paypal has led the online person to person innovation. Online person to person portals has given people the freedom to send money anytime anywhere without the need to go to a physical branch. The last one in 1997, when first mobile payment offered via short message service (SMS) in Finland in vending machines. The Early innovation of in mobile has come from developing nations where the majority of the population is unbanked. Companies like M-Pesa have facilitated person to person movement of money via stored value credit. Mobile networking operators (MNO), banks, and technology companies have been

investing heavily mobile payment to expect mobile payment development in the coming years [21].

Another approach to identifying how the evolution of mobile payment advanced toward into the 21st century is a chronological method. It was started when David Chaum created digital cash in 1983 [22]. Briefly, the evolution of mobile payment could be lined into timeline evolution.

- 1983: David Chaum, an American cryptographer, starts work on creating digital cash
- 1994: Although this is disputed, some believe that the first online purchase, a pepperoni and mushroom pizza from Pizza Hut, occurs in this year
- 1998: PayPal is founded.
- 1999: Ericsson and Telnor Mobil, mobile phones could be used to purchase movie tickets.
- 2003: 95 million cell phone users worldwide made a purchase via their mobile device.
- 2007: Both the iPhone and the Droid operating system are released.
- 2008: Bitcoin is invented.
- 2011: Google Wallet is released.
- 2014: Apple Pay is launched, followed a year later by Android and Samsung Pay
- 2020: ninety percent of smartphone users will have made a mobile payment. It is estimated that by 2017, there will be \$60 billion in mobile payment sales.

Reference [23] states that the growth of smartphone users are unavoidable and development of mobile payments are driven an increased level of adoption technology among consumers. Those could influence installation of mobile ecosystem examining the mobile payment landscape through key drivers. The key drivers assessed including broad smartphone adoption, developed financial infrastructure, and consumer interest in payment innovation. Consumers try enthusiastically digital wallets and other new technologies, even though some limitations limit the development of adoption mobile technology. Barriers evaluated include the preference for cash, security concerns, and consumer behaviour [24].

#### *D. The Missions of Mobile Payment on Acceleration of Financial Inclusion*

Adoption of mobile technology to assist the development of financial services provided through digital mobility technologies have multiple configurations, goals, and characteristics. Depending on the combination of agents, technologies and objectives, they may have banking features, which are known as mobile banking. They have transaction payment features, which are recognized as mobile payments. Finally, they may also replicate the concept of money with digital features, which is then called mobile money [25]. Empirical studies about FI remain vital, especially in developing countries like Nigeria, where little research studies have been conducted since the introduction of the Cashless economy policy. Review of the relevant literature reveals lack of comprehensive empirical research regarding the relationship between the cashless economy policy and financial inclusion in Nigeria. In this study, results showed that awareness, consumer/user value proposition, and infrastructure were found to have a strong significant relationship with FI, while business model of financial service providers did not show any significant relationship with FI [26].

Furthermore, government, as a regulator, provide all things to support information and computer technology (ICT) infrastructure and make a cooperation with cellular operators which make possible mobile phone customers can access to financial products and services. The transactions consist of business to business (B2B), person to person (P2P), business to personal (B2P), and personal to business (P2B). The services offered such as money transfers, payment of bills, government to person payments, P2P transactions, B2B transactions, B2P transactions and conversely, banking services, purchasing airtime, check balances, pay electricity bills, pay for goods and services, pay school fees, view statements, receive the salary, etc.

Cooperation is the important key performance indicator that ensures the implementation process to be successful. The synergy between stakeholders is needed such as a central bank, government institutions, public sector, microfinance, cooperatives, Customs tradition, Communities, ICT provider and society/business, and other agents. Accelerating of FI needs pillars:

society/community-private sectors, NGOs, public leaders/public sectors, information technology, microfinance and finance literacy which related to some steps namely; approach and process, main mechanisms of instruments and implementation [27]. However, there some fears of consumers related to issues of using mobile payments. The issues include security aspects, trusted providers, convenience and friendly user matters of the tool of payment [28]. The poor people who are living in rural areas are going to be covered by this payment system when those issues alongside the development of mobile networking operators' infrastructure and government regulation are solved.

## II. CONCLUSION

Mobile Payment is technology breakthrough to uncover people in the isolated regions taking benefits of financial services. Mobile payment ecosystem instruments have to be harmonised to adopt mobile technology generating networking among those parts of the mobile ecosystem. The evolution of mobile payment could describe how fast system payments are changed over time. ICT technology has developed rapidly to contribute the development and transformation of payment systems particularly in developing nations both in Africa and Asia to accelerate financial inclusion (FI).

Given the absence of previous research to provide a comprehensive analysis of mobile payment and financial inclusion, this framework forms a basis for undertaking subsequent empirical research that provides cultural and social aspects in this research in the future. The next researcher should consider rapid development of ICT technology as a catalyst to speed up mobile payment system penetrating into poor people who are uncovering banking services.

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